

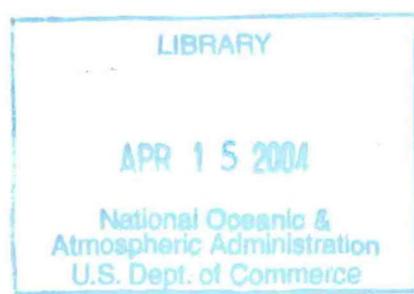
Surveys of Abandoned Vessels:

Guam and CNMI



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**SURVEYS OF ABANDONED VESSELS:
GUAM AND THE COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS**



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LIST OF ABBREVIATIONS

AVI	Abandoned Vessel Inventory
AVP	Abandoned Vessel Program
CNMI	Commonwealth of the Northern Mariana Islands
CRTF	Coral Reef Task Force
ft	feet
GPS	Global positioning system
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration
USCG	U.S. Coast Guard
WWI	World War I
WWII	World War II

SURVEYS OF ABANDONED VESSELS: U.S. PACIFIC REGION

INTRODUCTION

Grounded and abandoned vessels are a problem in many coastal areas, and they are a significant threat for coral reef habitats. In addition to the physical crushing and smothering of habitats, grounded vessels pose a significant threat of oil spills and releases of other pollutants, may impede navigation, block public and private uses of intertidal and subtidal habitats such as aquaculture, become a site for illegal dumping of waste oils and hazardous materials, be a visual eyesore, and become a wildlife entrapment and public health hazard.

The National Oceanic and Atmospheric Administration (NOAA) has a long and diverse interest in grounded and abandoned vessels, but action to address these threats has been limited and focused on specific threats. NOAA cartographers note the location of wrecks on nautical charts to facilitate safe navigation. NOAA Office of Response and Restoration works on pollution threats from vessels. NOAA Fisheries works on entanglement hazards and debris removal from vessels. However, with the exception of vessels grounded in the National Marine Sanctuaries, no action is usually taken to address the vessel itself or restoration of the grounding site. This is because existing federal laws and regulations provide less than optimal authority to promptly remove grounded vessels or abandoned vessels that are causing harm to natural resources but which are not otherwise obstructing or threatening to obstruct navigation, or threatening a pollution discharge.

In 1999, the U.S. Coast Guard, NOAA, and the Commonwealth of American Samoa began a collaborative effort to address nine abandoned fishing vessels on a reef in Pago Pago, American Samoa. These vessels were a public nuisance and posed an array of threats, including pollution, public health, and physical crushing of coral habitats. Using the combined authorities of the three agencies, the vessels were cleaned, cut apart, and removed from the reef, and the grounding sites were restored. This experience, combined with increasing agency concerns about the decline of coral habitats from a variety of causes, led NOAA and others to inquire whether abandoned vessels may be causing significant harm to coral habitats elsewhere.

At the same time, the U.S. Coral Reef Task Force (CRTF) published their National Action Plan, and identified groundings as a significant factor in the loss of reef habitat.

"Every year hundreds of vessels strike U.S. coral reefs, causing significant damage that goes largely unrepaired and unrecovered. In the Florida Keys National Marine Sanctuary alone, approximately 500 small vessel groundings occur each year. Vessels striking shallow coral reefs can cause profound damage to the habitat by destroying the benthic community, displacing resident fishes, and eliminating critically important topographic complexity and habitat structure that is the result of thousands of years of growth."

In response to the National Action Plan, NOAA implemented the Abandoned Vessel Program (AVP) to investigate the problems posed by abandoned and derelict vessels on U.S. coral reef habitats. This effort has a number of elements:

- 1) Understanding the scope of the issue. NOAA's efforts in this element are well established and include: development of an extensive database of abandoned vessels¹ in U.S. waters and holding workshops with local stakeholders to help them identify local management challenges and to assist us in understanding local differences in the issue. This element also includes field surveys like those described in this document and the 2002 Caribbean survey report. This work is designed to develop new data and ground truth information gathered from other sources.
- 2) Removal assistance for local governments. This element is currently moving from planning stages to implementation. The majority of the support we will provide will be in the form of technical assistance. NOAA has already begun providing legal assistance on a limited basis and will soon add a suite of technical references and experienced salvage advice. Additionally, we plan to assist with planning and funding of specific vessel removals on a small scale.
- 3) General education. The educational element of the AVP includes general presentations on the issue to coastal managers and practitioners across the country. We hope to add education programs for the general public in the future as part of an effort to prevent groundings and derelict vessels.

A primary vehicle for both the removal assistance and education elements is the Abandoned Vessel Program website: <http://response.restoration.noaa.gov/dac/vessels/>.

The following report summarizes survey work conducted during June of 2003 in Guam and the Commonwealth of the Northern Mariana Islands (CNMI).

STUDY METHODS

The vessels included in this report are a subset of vessels in the Abandoned Vessel Inventory (AVI) database developed by NOAA's Office of Response and Restoration. The AVI database is a compilation of existing data from sources such as NOAA, the U.S. Coast Guard, U.S. Navy, States, Territories and the maritime industry, as well as original data from charts and interviews with local sources. Development of the database began in August 2001, and information is regularly being added and refined. While the database focuses on regions of the U.S. with coral, not all of the vessels are aground on coral or associated habitats. Because the database contains too many vessels to feasibly survey in the field, records were filtered to identify those vessels that were most likely to be located in sensitive habitats. This selection was based on their mapped location, vessel information, local knowledge of vessel locations, and IKONOS satellite imagery as provided by the NOAA National Ocean Service, Special Projects

¹ The field surveys focused on derelict vessels that were aground, broken apart, sunken, showed no sign of maintenance, use, or were otherwise dilapidated in their condition. Some of these vessels may still have a concerned owner. Our use of the word "abandoned" in the text and tables of this report is not intended to connote any legal conclusions about the status of the titles of the vessels being addressed.

Office. The subset of vessels was then sorted based on logistical considerations; only nearshore vessels in the intertidal or shallow subtidal that were readily accessible by small boat or from shore were surveyed. As a result, this report should not be viewed as a complete inventory.

The information in the AVI database was derived from a number of sources. In some cases, the position information may be approximate, identifying numbers and names may be obscured or removed, and the description of the vessel may be vague or imprecise. Furthermore, new vessels continue to become abandoned while older vessels degrade, shift in position, or are occasionally removed. Therefore, some vessels in the database were flagged as potential duplicates with slightly different descriptions or positions. Effort was made to search all of the vessels using their reported positions, but in some cases no vessel was found, while in other instances, multiple vessels were found when only one was charted. Vessels found during the field surveys were photographed and position information was collected to help sort out duplicate records, but some duplicate records may persist in the database.

Two types of field surveys were conducted:

1. A full site assessment and completion of a detailed survey form, which was based on the following activities:
 - a. The current location of the vessel was determined using global positioning system (GPS) receivers;
 - b. The vessel was inspected to the extent possible, recording the vessel type, construction, dimensions, conditions, etc.;
 - c. A biologist conducted a snorkel survey of the benthic habitats and visual surveys of the adjacent intertidal habitats; and
 - d. The entire site, vessel footprint, and adjacent habitats were filmed using underwater video and digital photography following a set pattern.
2. A rapid assessment, conducted at vessels with low potential environmental impact or restoration value, consisting of the following activities:
 - a. The current location of the vessel was determined using GPS;
 - b. The vessel type and dimensions were recorded;
 - c. A biologist made a quick site assessment; and
 - d. The site was photographed and videotaped.

The completed field forms and a photograph of each vessel are included in a separate document that contains two appendices: Appendix A for the Guam vessels and Appendix B for the CNMI vessels. This document is available from the NOAA Damage Assessment Center's website <http://response.restoration.noaa.gov/dac/vessels/documents.html>.

SURVEY RESULTS

Along the coast of Guam there are 131 abandoned vessel sites recorded in the databases provided by NOAA and the U.S. Navy. Because the surveys were conducted rapidly using only snorkeling equipment, vessels deeper than approximately 40 feet (ft) were typically not

surveyed; 80 vessel sites were excluded due to depth. The remaining 51 sites were accounted for through field surveys and interviews with local Department of Agriculture staff and USCG personnel. Thirteen (13) vessels were identified as having been removed or pulled offshore and resunk. Three (3) vessels were found to be commercial dive sites and were hence not field checked. Four (4) vessels are known to have broken up and disintegrated to a state of low concern and 1 vessel is known to have been dry docked and is currently undergoing repairs. It was not possible to account for 18 of the vessels listed in the database. In several of these cases it is likely that the site in the database was visited and the vessel surveyed but lack of unique descriptors and/or latitude/longitude coordinates made true confirmation impossible. Twelve (12) of the vessels listed in the database were definitively surveyed. In addition, 19 new vessels were identified, surveyed and added to the database. Thirty-one (31) total vessels were located and field surveyed on Guam. Figure 1 shows the locations of these vessels with their general habitat type. Table 1 is a summary of information associated with each surveyed vessel.

Twenty-six (26) vessel sites were listed in the NOAA database for the islands of Saipan, Rota, and Tinian in the CNMI. Ten (10) vessels were considered too deep (> 40 ft) and were not surveyed for logistical reasons. Four (4) vessels have been salvaged, dry docked, or otherwise removed. One (1) record was a duplicate of another vessel already recorded in the database. It was not possible to survey 1 vessel undergoing Coast Guard investigation, and 2 vessels could not be found at the coordinates provided. Eight (8) of the 26 total vessels in the NOAA database for the CNMI were located in the field and surveyed. Thirty-four (34) new vessels were located, surveyed, and added to the database. Figures 2 and 3 show the locations of the surveyed vessels with their general habitat type in Saipan, Tinian, and Rota. Table 2 is a summary of information associated with each surveyed vessel.

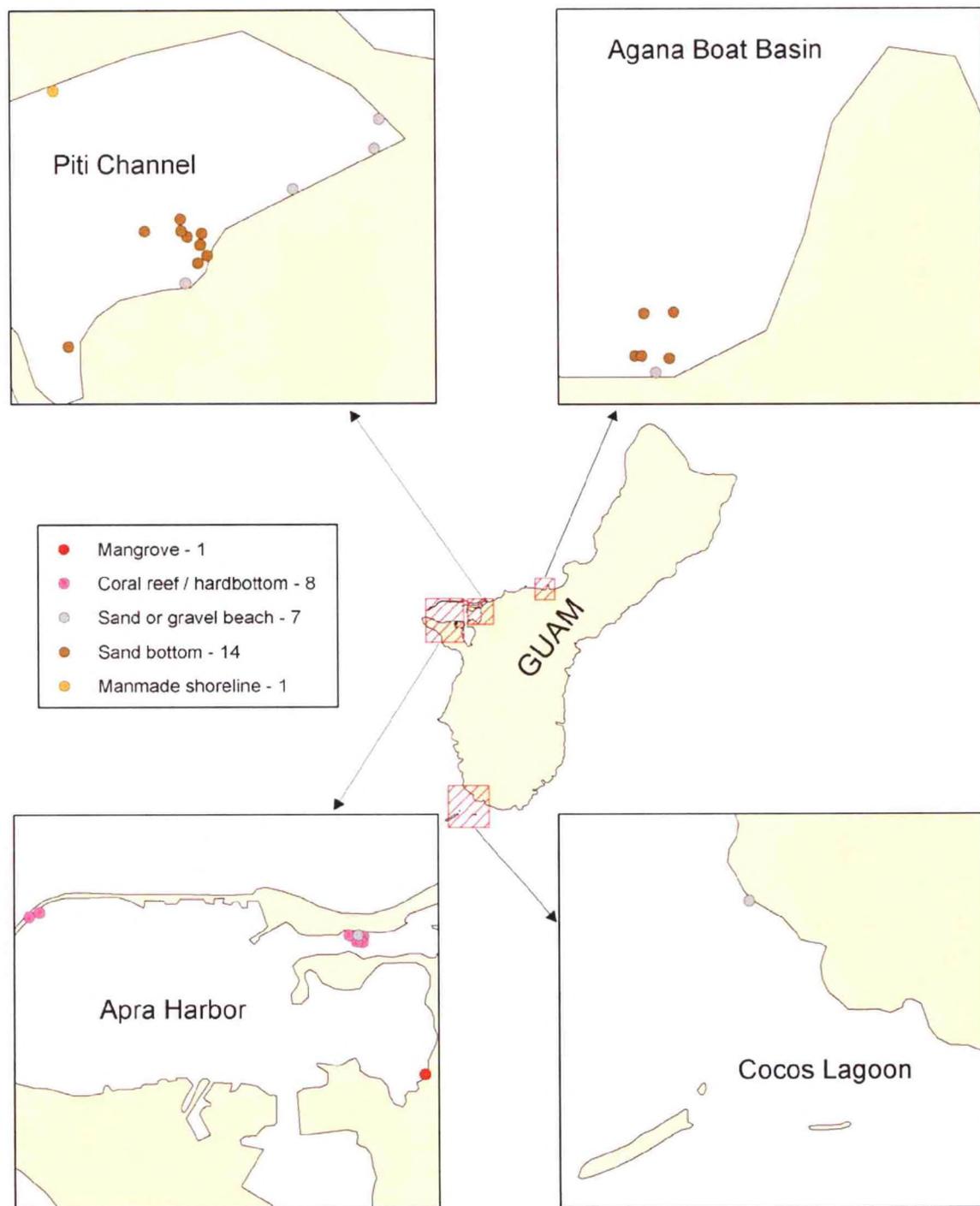


FIGURE 1. Location map showing the distribution of the 31 abandoned vessels surveyed in June 2003 in Guam, with insets for the priority regions. The symbol color indicates the primary habitat in the vicinity of the vessel.

TABLE 1. Summary information for the 31 vessels surveyed in Guam.

Vessel Name/Incident ID	Location	Description	Threats	Habitat
<i>Lady Katherine/2522</i>	Piti Channel, Guam	American longliner, fiberglass, 58 X 11 ft, ashore	Pollution: Batteries, other equipment Navigation: No Public Health: Yes, slip/fall hazard	Gravel beach
Unk2523	Piti Channel, Guam	Sailboat, fiberglass, 21 X 6.5 ft, ashore	Pollution: No Navigation: No Public Health: Yes, slip/fall hazard	Gravel beach
<i>Dolphin Dancer/2524</i>	Piti Channel, Guam	Sailboat, 26 X 8 ft, at water depth of 3- 7 ft, exposed at high tide	Pollution: No Navigation: Yes Public Health: No	Sand bottom
Unk1906	Piti Channel, Guam	Landing craft, steel, 55 X 13 ft, large portions exposed at high tide	Pollution: No Navigation: Yes Public Health: No	Sand bottom
<i>Guahan 2/294</i>	Piti Channel, Guam	YFU Landing Craft, steel, 115 X 32 ft, large portions exposed at high tide	Pollution: No Navigation: Yes Public Health: Possible slip/fall or entrapment hazard	Sand bottom
<i>Crystal Be --/2525</i>	Piti Channel, Guam	Sailboat, fiberglass, 16 X 10 ft, lying on side, exposed at high tide	Pollution: No Navigation: Yes Public Health: Possible slip/fall or entrapment hazard	Sand bottom
Piti Dive Barge/1902	Piti Channel, Guam	Salvage tug/ barge, 39 X 15 ft, tied to seawall	Pollution: Possibility of oil onboard Navigation: Yes Public Health: Yes, slip/fall or entrapment hazard	Manmade shoreline
Unk2526	Piti Channel, Guam	Barge, wooden, deck missing, 16 X 5X 1.5 ft, ashore	Pollution: No Navigation: No Public Health: Possible slip/fall hazard	Sand beach

TABLE 1. *Cont.*

Unk2527	Piti Channel, Guam	Sloop, fiberglass, 35 X 9 ft, submerged, attached to <i>Guahan-2</i> on starboard side	Pollution: No Navigation: Yes Public Health: No	Sand bottom
Unk2528	Piti Channel, Guam	Ketch, fiberglass, 53 X 14 ft, intact, submerged	Pollution: No Navigation: Yes Public Health: No	Sand bottom
<i>Chamorro-1/292</i>	Piti Channel, Guam	Longliner, fiberglass, 49 X 10.5 ft, upside down, exposed at high tide	Pollution: No Navigation: Yes Public Health: Yes, slip/fall hazard	Sand bottom
Unk2529	Piti Channel, Guam	Landing craft, steel, 50 X 14 ft, exposed at high tide	Pollution: No Navigation: No Public Health: Yes, slip/fall hazard	Sand bottom
<i>Merlin/1903</i>	Piti Channel, Guam	Ketch, fiberglass, 41 X 9 ft, ashore	Pollution: No Navigation: No Public Health: Yes, slip/fall hazard	Gravel beach
Unk2530	Outer Piti Channel, Guam	Barge, steel, 30 X 100 ft, partially ashore	Pollution: No Navigation: No Public Health: Yes slip/fall or entrapment hazard	Coral reef/ hardbottom, lagoonal fauna
Unk1909	Outer Piti Channel, Guam	Freighter, steel, 26 X 120 ft, exposed	Pollution: No Navigation: Yes Public Health: Yes slip/fall or entrapment	Coral reef/ hardbottom, lagoonal fauna
Piti Crane Barge/1910	Outer Piti Channel, Guam	Crane barge, steel, 30 X 100 ft, exposed	Pollution: No Navigation: Yes Public Health: Yes slip/fall or entrapment	Coral reef/ hardbottom, lagoonal fauna
<i>Guahan-1/293</i>	Outer Piti Channel, Guam	Landing craft, steel, 115 X 32 ft, exposed	Pollution: No Navigation: Possible if moved during a storm Public Health: No	Coral reef/ hardbottom, lagoonal fauna
Unk2531	Outer Piti Channel, Guam	Vessel type unknown, possible barge, 27 X 67 ft, rusting steel	Pollution: No Navigation: No Public Health: Yes, slip/fall or entrapment	Coral reef/ hardbottom, lagoonal fauna

TABLE 1. *Cont.*

Unk2532	Outer Apra Harbor, Guam	Barge, cement, 132 X 54 ft, exposed	Pollution: No Navigation: No Public Health: Yes, slip/fall hazard	Coral reef/ hardbottom
Unk2533	Outer Apra Harbor, Guam	Barge, cement, 200 ft long, partially exposed	Pollution: No Navigation: No Public Health: Yes, slip/fall hazard	Coral reef/ hardbottom
Unk2534	Outer Apra Harbor, Guam	Barge in 2 pieces, steel, 138 X 55 ft, submerged	Pollution: No Navigation: No Public Health: Yes, slip/fall hazard	Coral reef/ hardbottom
Unk2535	Outer Apra Harbor, Guam	Barge in 2 pieces, steel, 130 X 55 ft, middle section is collapsed, exposed	Pollution: No Navigation: No Public Health: Yes, slip/fall hazard	Coral reef/ hardbottom
Unk2536	Inner harbor of Piti Channel, Guam	Trimaran, fiberglass, 41 X 23 ft, upside down, 1 pontoon missing, aground & ashore	Pollution: No Navigation: Yes, In mooring area Public Health: Yes, slip/fall hazard	Sand and gravel bottom
<i>Seagull/2537</i>	Sasa Bay, Guam	Sailboat, fiberglass, 70 X 13 ft, ashore	Pollution: Yes, fuel on board Navigation: No Public Health: Yes, slip/fall hazard	Mangroves
<i>Windsong/2538</i>	Agana Boat Basin, Guam	Sailboat, fiberglass, 27 X 5 ft, exposed	Pollution: No Navigation: No Public Health: No	Sand and gravel bottom
Unk2539	Agana Boat Basin, Guam	Sailboat, steel, 55 X 13 ft, aground	Pollution: No Navigation: No, but may move in storm Public Health: No	Sand and gravel bottom
Unk2540	Agana Boat Basin, Guam	Sailboat, fiberglass, 25 X 8 ft, exposed	Pollution: No Navigation: No, but may move in storm Public Health: No	Sand and gravel bottom
<i>Ciao/2541</i>	Agana Boat Basin, Guam	Sailboat, fiberglass, 41X10 ft, ashore, no mast	Pollution: No Navigation: No Public Health: Yes, slip/fall	Gravel beach and riprap shoreline

TABLE 1. *Cont.*

Unk1900	Agana Boat Basin, Guam	Sloop, ferro-cement, 35 X 12 ft, partially exposed	Pollution: No Navigation: Yes Public Health: No	Sand bottom
<i>Lion's Den</i> /1901	Agana Boat Basin, Guam	Ketch, steel, upside down, partially exposed	Pollution: Yes, batteries, engine block and fuel tank possibly still onboard Navigation: Yes Public Health: No	Sand bottom
Unk2542	Cocos Lagoon, Guam	Sloop, fiberglass, 20 X 7 ft, inverted and under dock	Pollution: No Navigation: No Public Health: Yes, slip/fall	Sand and gravel beach

*Threats are preliminary determinations and could change.

Table 3 presents information on the number of vessels by vessel type, primary habitat type in the immediate vicinity of the vessel, and whether there was a potential pollution, navigation, or public health hazard. Figures 4, 5, and 6 show the distribution for Guam and the islands of the CNMI by vessel type. In Guam, 45 percent of the vessels surveyed (14 of 31) were recreational sailboats. Six (6) of these vessels were ashore and 2 aground as the result of typhoons. Most had been stripped of all salvageable materials. Thirty-five (35) percent of vessels surveyed in Guam were commercial vessels of various types, including long-liners, barges, freighters, cargo vessels, charter boats, work boats, etc. In the CNMI, 76 percent of the vessels surveyed (32 of 42) were military or government owned, and 27 of these 32 were rusting WWII era barges. It is unknown when most of these went aground but several are deeply mired in the sediment or in some cases have corals and other organisms growing on them.

Table 3 also lists the habitats that are associated with coral reef ecosystems, which include coral reef/hardbottom habitats, mangroves, seagrasses, and mixed macroalgae/seagrass habitats. In Guam only 1 of the 31 vessels surveyed (the *Seagull*) was located in mangrove habitat. Most other vessels (72%) were associated with sand, gravel, or sand and gravel beaches and bottom sediments or manmade shorelines. Seven (7) vessels (23%) were associated with coral reef/hardbottom habitats. Live coral cover was typically not high where vessels were surveyed in Guam. In the CNMI, 11 of the 42 vessels (26%) were located on coral reef or hardbottom habitats, typically with higher live coral cover than was observed in Guam. Of the remaining 31 vessels surveyed, 7 vessels (17%) were located in mangrove habitats, 3 vessels (7%) were located in seagrass habitats (70-90% cover in some cases), 15 vessels (36%) were located in mixed macroalgae/seagrass habitats, and 6 vessels (15%) were located on beaches or engineered coastlines.

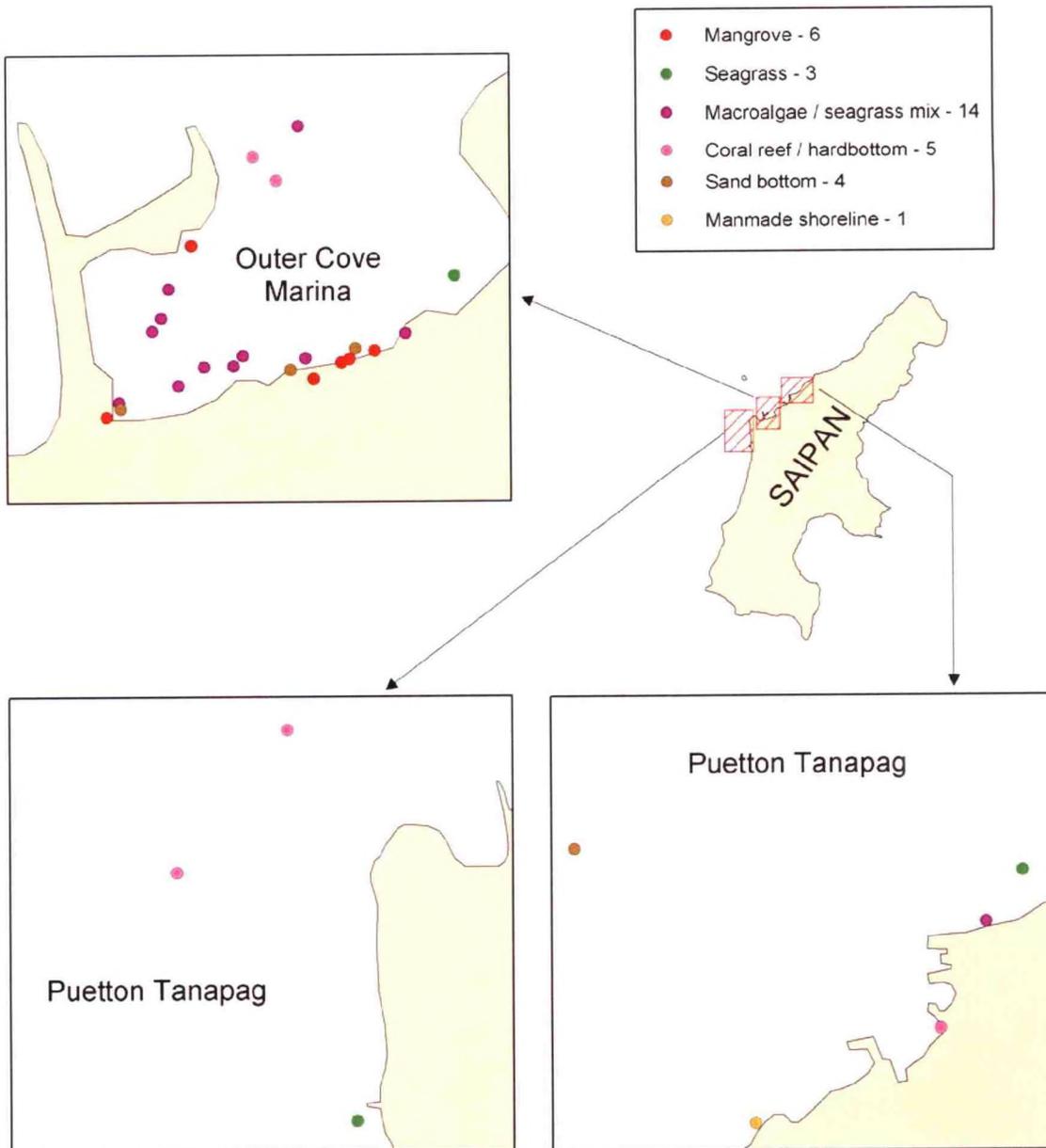


FIGURE 2. Location map showing the distribution of the 33 vessels surveyed in June 2003 in Saipan, CNMI, with insets for the priority regions. The symbol color indicates the primary habitat in the vicinity of the vessel.

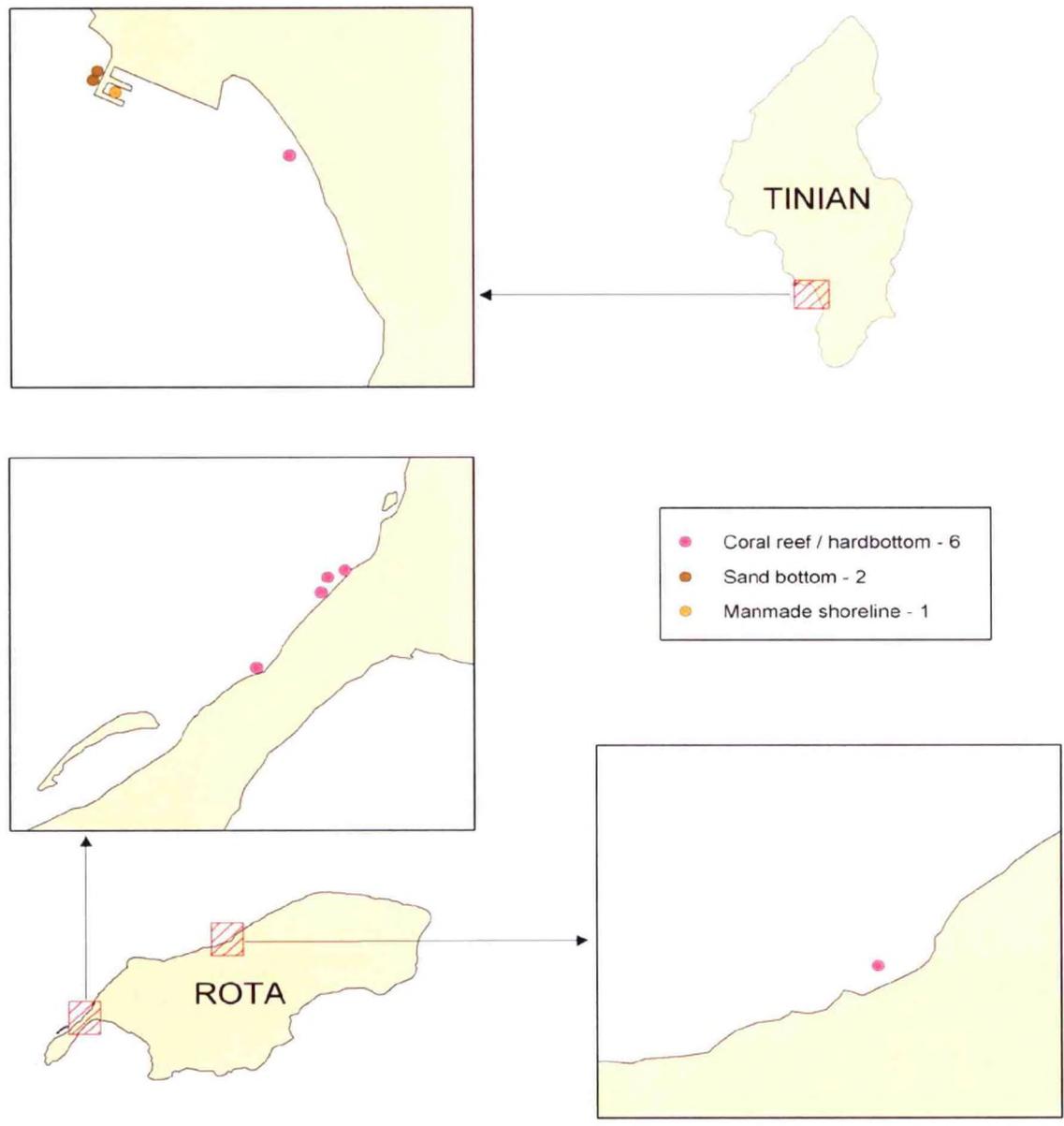


FIGURE 3. Location map showing the distribution of the 9 vessels surveyed in June 2003 in Tinian and Rota, CNMI, with insets for the priority regions. The symbol color indicates the primary habitat in the vicinity of the vessel.

TABLE 2. Summary information for the 42 vessels surveyed in the Commonwealth of the Northern Mariana Islands (Saipan, Tinian, and Rota).

Vessel Name/Incident ID	Location	Description	Threats	Habitat
<i>Charito/1252</i>	Lower Base, Saipan	Longliner, steel, 97 X 23 ft, aground	Pollution: Possibly batteries Navigation: No Public Health: Yes, entrapment hazard	Coral reef/hardbottom; patchy seagrass and algae
<i>Samala/1251</i>	Outer Cove Marina, Saipan	Converted cabin cruiser, wooden, 110 X 16 ft, partially exposed	Pollution: Yes, fuel and compressed gas tanks potentially onboard/in debris Navigation: No Public Health: Yes, slip/trip and entrapment hazard	Coral reef, patchy seagrass and algae
<i>Nago No. 15/1253</i>	Outer Cove Marina, Saipan	Longliner, fiberglass, 53 X 16 ft, aground	Pollution: Yes, hydraulic fluid and refrigerant may be present Navigation: No Public Health: Yes, slip/fall hazard	Seagrass
Unk2543	Outer Cove Marina, Saipan	Barge, steel, 71 X 86 ft, exposed	Pollution: No Navigation: Yes Public Health: Yes, slip/fall hazard	Mixed macroalgae and seagrass beds
Unk2544	Outer Cove Marina, Saipan	Barge, steel, 74 X 88 ft, exposed	Pollution: No Navigation: Yes Public Health: Yes, slip/fall hazard	Mixed macroalgae and seagrass beds
Unk2545	Managuni Sanctuary, Saipan	Cargo vessel or whaler, steel, 367 X 100 ft, submerged	Pollution: No Navigation: Yes Public Health: No	Sand and gravel bottom
<i>Mwaalil Saat, formerly Mariana Lady/2546</i>	Outside harbor at Puerto Rico dump, Saipan	Stern trawler, floating	Pollution: Yes, fuel onboard Navigation: No Public Health: Yes, slip/fall hazard	Manmade shoreline
Unk2547	Saipan Lagoon, Saipan	Barge, steel, exposed in surf	Pollution: No Navigation: Yes Public Health: Yes, slip/fall hazard	Coral reef/hardbottom
Unk2548	Saipan Lagoon, Saipan	Freighter, cement, exposed in surf	Pollution: No Navigation: No Public Health: No	Coral reef/hardbottom

TABLE 2. *Cont.*

Unk2550	Outer Cove Marina, Saipan	Barge, steel, ashore	Pollution: No Navigation: No Public Health: Yes, slip/fall hazard	Mangroves
Unk2551	Outer Cove Marina, Saipan	Barge, steel, exposed	Pollution: No Navigation: Yes Public Health: Yes, slip/fall hazard	Sand bottom
Unk2553	Outer Cove Marina, Saipan	Barge, steel, exposed	Pollution: No Navigation: No Public Health: Yes, slip/fall hazard	Mangroves
Unk2554	Outer Cove Marina, Saipan	Barge, steel, exposed	Pollution: No Navigation: No Public Health: Yes, slip/fall hazard	Mangroves
Unk2555	Outer Cove Marina, Saipan	Barge, steel, exposed	Pollution: No Navigation: Yes Public Health: Yes, slip/fall hazard	Sand bottom
Unk2556	Outer Cove Marina, Saipan	Barge, steel, ashore	Pollution: No Navigation: No Public Health: Yes, slip/fall hazard	Mangroves
Unk2557	Outer Cove Marina, Saipan	Barge, steel, exposed	Pollution: No Navigation: Yes Public Health: Yes, slip/fall hazard	Mix of macroalgae and seagrass beds
Unk2558	Outer Cove Marina, Saipan	Barge, steel, exposed	Pollution: No Navigation: Yes Public Health: Yes, slip/fall hazard	Seagrass
Unk2559	Outer Cove Marina, Saipan	Barge, steel, exposed	Pollution: No Navigation: Yes Public Health: Yes, slip/fall hazard	Mix of macroalgae and seagrass beds
Unk2560	Outer Cove Marina, Saipan	Barge, steel, exposed	Pollution: No Navigation: Yes Public Health: Yes, slip/fall hazard	Mix of macroalgae and seagrass beds
Unk2562	Outer Cove Marina, Saipan	Barge, steel, ashore	Pollution: No Navigation: No Public Health: Yes, slip/fall hazard	Mix of macroalgae and seagrass beds

TABLE 2. *Cont.*

Unk2564	Outer Cove Marina, Saipan	Barge, steel, exposed	Pollution: No Navigation: Yes Public Health: Yes, slip/fall hazard	Mix of macroalgae and seagrass beds
Unk2565	Outer Cove Marina, Saipan	Barge, steel, exposed	Pollution: No Navigation: No Public Health: Yes, slip/fall hazard	Mix of macroalgae and seagrass beds
Unk2566	Outer Cove Marina, Saipan	Barge, steel, ashore	Pollution: No Navigation: No Public Health: Yes, slip/fall hazard	Mangroves
Unk2567	Outer Cove Marina, Saipan	Barge, steel, exposed	Pollution: No Navigation: No Public Health: Yes, slip/fall hazard	Sandy bottom
Unk2568	Outer Cove Marina, Saipan	Barge, steel, exposed	Pollution: No Navigation: Yes Public Health: Yes, slip/fall hazard	Mix of macroalgae and seagrass beds
Unk2569	Outer Cove Marina, Saipan	Barge, steel, exposed	Pollution: No Navigation: Yes Public Health: Yes, slip/fall hazard	Mix of macroalgae and seagrass beds
Unk2570	Outer Cove Marina, Saipan	Barge, steel, exposed	Pollution: No Navigation: Yes Public Health: Yes, slip/fall hazard	Mix of macroalgae and seagrass beds
Unk2571	Outer Cove Marina, Saipan	Barge, steel, exposed	Pollution: No Navigation: Yes Public Health: Yes, slip/fall hazard	Mix of macroalgae and seagrass beds
Unk2572	Outer Cove Marina, Saipan	Barge, steel, exposed	Pollution: No Navigation: No Public Health: Yes, slip/fall hazard	Mix of macroalgae and seagrass beds
Unk2573	Outer Cove Marina, Saipan	Barge, steel, exposed	Pollution: No Navigation: No Public Health: Yes, slip/fall hazard	Mangroves
Unk2574	Outer Cove Marina, Saipan	Barge, steel, exposed	Pollution: No Navigation: Yes Public Health: Yes, slip/fall hazard	Coral reef/ hardbottom, macroalgae

TABLE 2. *Cont.*

Unk2575	Outer Cove Marina, Saipan	Barge, steel, exposed	Pollution: No Navigation: Yes Public Health: Yes, slip/fall hazard	Mix of macroalgae and seagrass beds
Unk2576	Outer Cove Marina, Saipan	Barge, steel, exposed	Pollution: No Navigation: Yes Public Health: Yes, slip/fall hazard	Seagrass
<i>Lian Gi/2577</i>	Tinian Harbor, Tinian	Freighter, steel, 44.5 X 129 ft, afloat	Pollution: Yes, fuel and contaminated ballast sediment Navigation: No Public Health: Yes, slip/fall and entrapment hazard	Manmade shoreline
Unk2578	Tinian Harbor, Tinian	Fishing boat, ferro-cement, 55 X 16 ft, aground	Pollution: No Navigation: No Public Health: Yes, slip/fall and entrapment hazard	Sandy bottom
Unk2579	Tinian Harbor, Tinian	Yacht, steel, 38 X 13.5 ft, submerged	Pollution: No Navigation: No Public Health: Yes, slip/fall and entrapment hazard	Sandy bottom
<i>Sun Long No.8/1828</i>	Tinian Harbor, Tinian	Freighter, steel, 325 ft bow to stern, exposed	Pollution: No Navigation: Yes Public Health: Yes, slip/fall and entrapment hazard	Coral reef/hardbottom
<i>#62 Nam Sung/1832</i>	Sasanlago-Tatqua Beach, Rota	Fishing vessel, steel, 26.5 X 63 ft, exposed	Pollution: No Navigation: No Public Health: Yes, slip/fall and entrapment hazard	Coral reef/hardbottom
<i>T.T. Gov't 1/1830</i>	Sasanlago, Rota	U.S. Military "M-boat", steel, 106 X 29 ft, aground, exposed	Pollution: No Navigation: No Public Health: Yes, slip/fall and entrapment hazard	Coral reef/hardbottom
<i>T.T. Gov't 2/1831</i>	Sasanlago, Rota	U.S. Military "M-boat", steel, 106 X 29 ft, aground, exposed	Pollution: No Navigation: No Public Health: Yes, slip/fall and entrapment hazard	Coral reef/hardbottom

TABLE 2. *Cont.*

Unk2581	Sasanlago, Rota	U.S. military “M-Boat”, steel, 106 X 29 ft, aground, exposed	Pollution: No Navigation: No Public Health: Yes, slip/fall and entrapment hazard	Coral reef/ hardbottom
<i>Rota Queen</i> /1829	Sasanlago, Rota	Tugboat, steel, 65.5 X 11 ft, aground, exposed	Pollution: No Navigation: No Public Health: Yes, slip/fall and entrapment hazard	Coral reef/ hardbottom

*Threats are preliminary determinations and could change.

Information on potential pollution, navigational, and public health threats are also summarized in Table 3. It should be noted that the threat determination is preliminary and could change upon further investigation. The U.S. Coast Guard has been proactive in removing fuel and/or vessels that pose a significant pollution threat. Four (4) of the vessels in Guam were found to be potential pollution threats. The *Seagull* (Incident ID: 2537) is known to have 128 gallons of gasoline and 40 gallons of oil onboard. Other vessels such as the Piti Dive Barge (Incident ID: 1902) and the *Lion's Den* (Incident ID: 1901) are suspected to have fuel on board but specific details remain unknown. Both the *Lady Katherine* (Incident ID: 2522) and *Lion's Den* had batteries and other materials onboard. Of the vessels surveyed in the CNMI, 5 were found to be potential pollution threats. The *Samala* (Incident ID: 1251), a broken down wooden cabin cruiser, likely has fuel onboard and compressed gas tanks were observed on site. Two (2) vessels that remain afloat but are derelict, the *Lian Gi* (Incident ID: 2577) and *Mwaalil Saat* (Incident ID: 2546), have fuel on board. In the case of the *Lian Gi*, efforts have been made to remove portions of the fuel and fuel contaminated ballast sediment. The *Nago No. 15* (Incident ID: 1253) contains unknown (possibly only minor) amounts of coolant and hydraulic fluid.

TABLE 3. Information on vessel type, habitat and potential threats for the 73 vessels surveyed in Guam (31 vessels), Rota, Saipan, and Tinian (42 vessels total) in the CNMI.

Area	Vessel Type	Coral Reef Habitat	Seagrass Habitat	Mangrove Habitat	Macroalgae/ Seagrass Mix	Potential Pollution Threat	Potential Navigation Threat	Potential Public Health Threat
Guam	Commercial: 11 Recreational: 14 Gov/Military: 6	8	0	1	0	4	14	15
U.S. CNMI	Commercial: 9 Recreational: 1 Gov/Military: 32	11	3	7	15	5	19	39

Fourteen (14) of the 31 vessels surveyed in Guam may be considered potential threats to navigation. All of these were associated with clusters of vessels found in Piti Channel and the Agana Boat Basin. Several vessels were grounded near the shoreline and are of lesser concern unless they are to move during a storm. Nine (9) vessels were located near the center of the channel or mooring area, and are a more immediate concern. Most vessels were visible at low tide, but some of the smaller recreational craft may not be visible at high tide. Nineteen (19) vessels in the CNMI islands surveyed are considered navigational threats. The majority of vessels considered to be navigational threats are WWII era barges located in sheltered coves and nearshore areas in Saipan. Unk2545, a submerged Japanese freighter (Incident ID: 2545) located southeast of Mañagha Island represents a navigational threat in deeper open water. The *Sun Long No. 8* (Incident ID: 1828) is a large partially exposed steel freighter located in Tinian Harbor. It is poorly marked aside from the large kingposts still visible above the water.

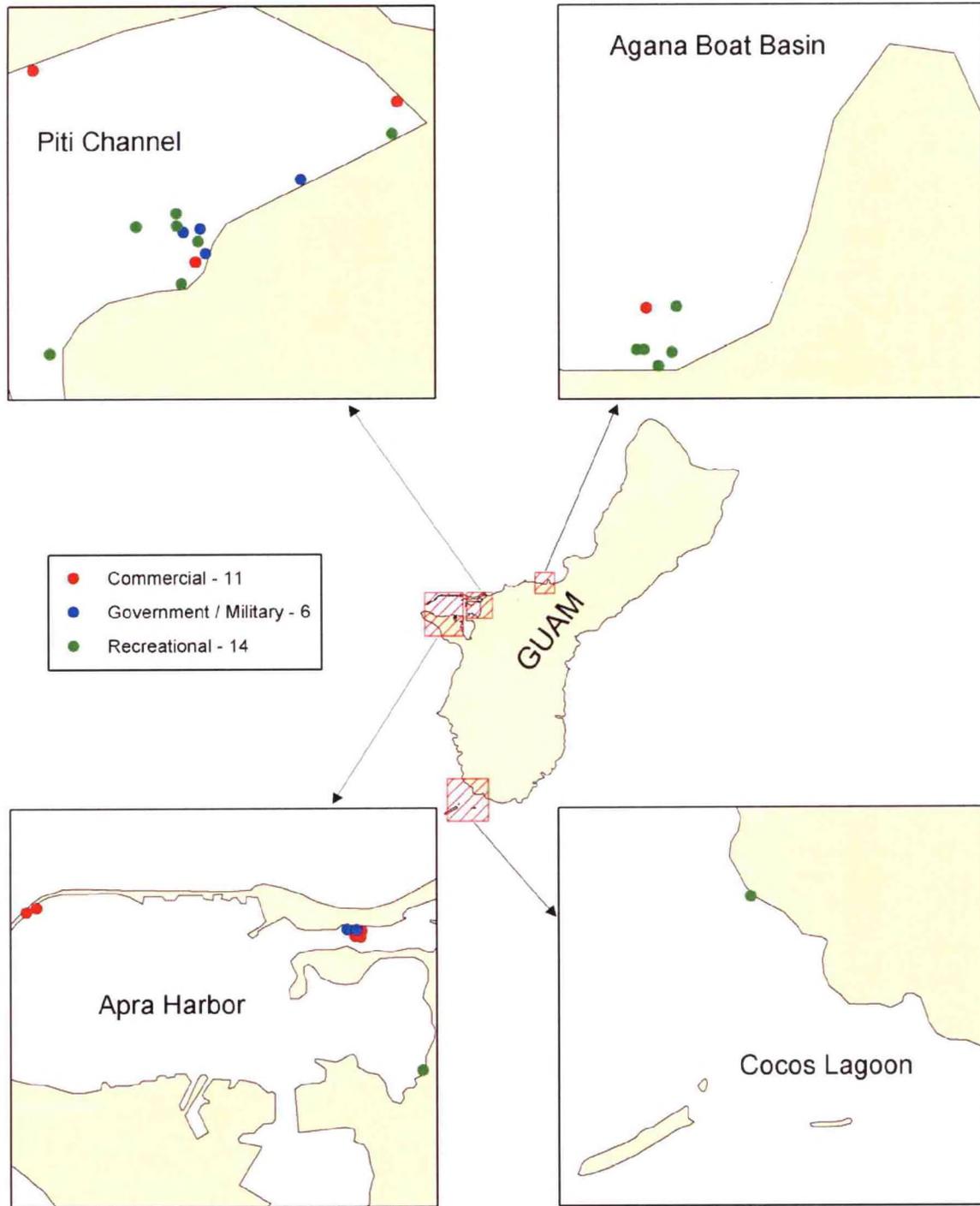


FIGURE 4. Location map showing the distribution of the 31 vessels surveyed in June 2003 in Guam with insets for the priority regions. The symbol color indicates the vessel type.

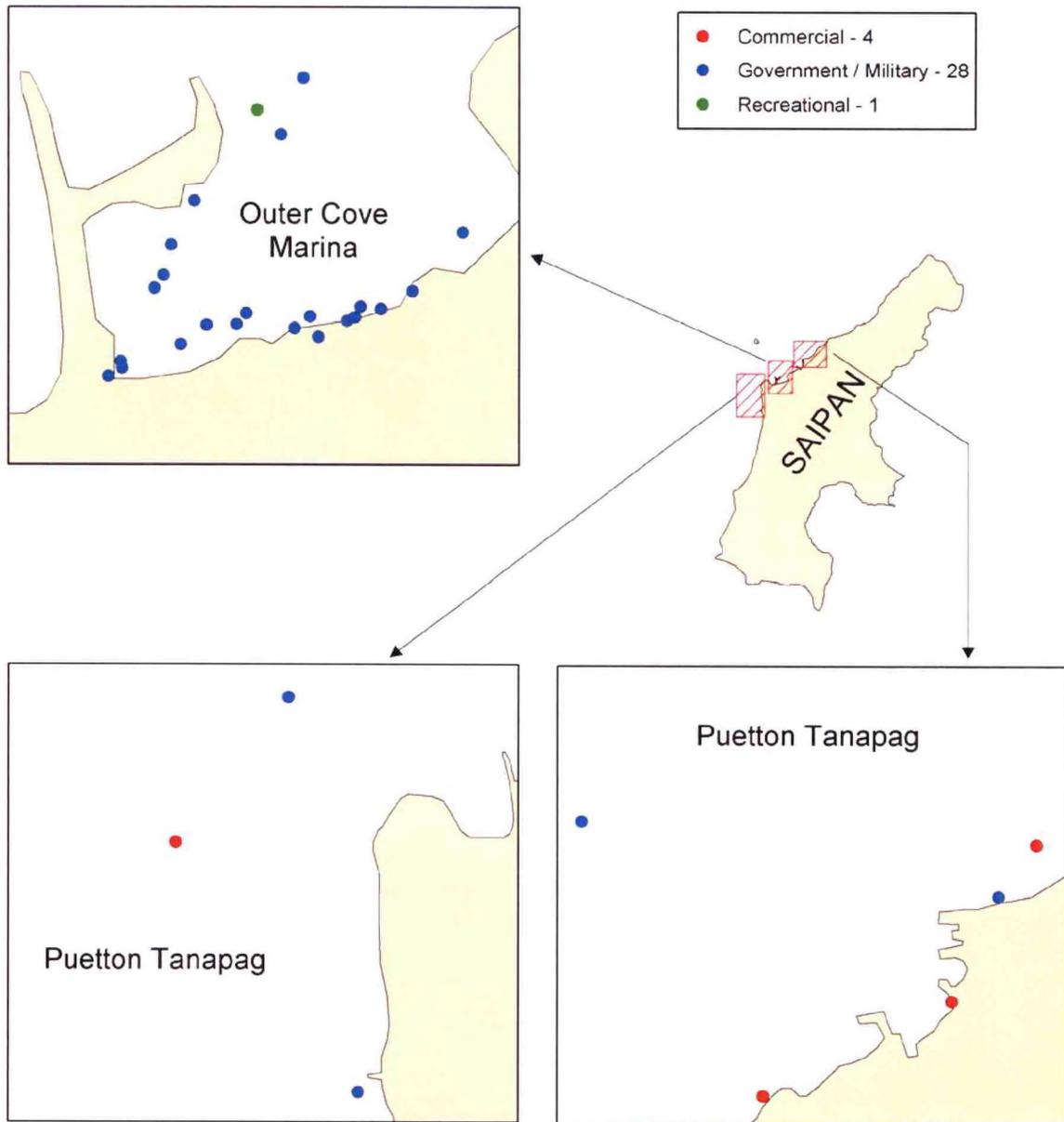


FIGURE 5. Location map showing the distribution of the 33 vessels surveyed in June 2003 in Saipan, CNMI with insets for the priority regions. The symbol color indicates the vessel type.

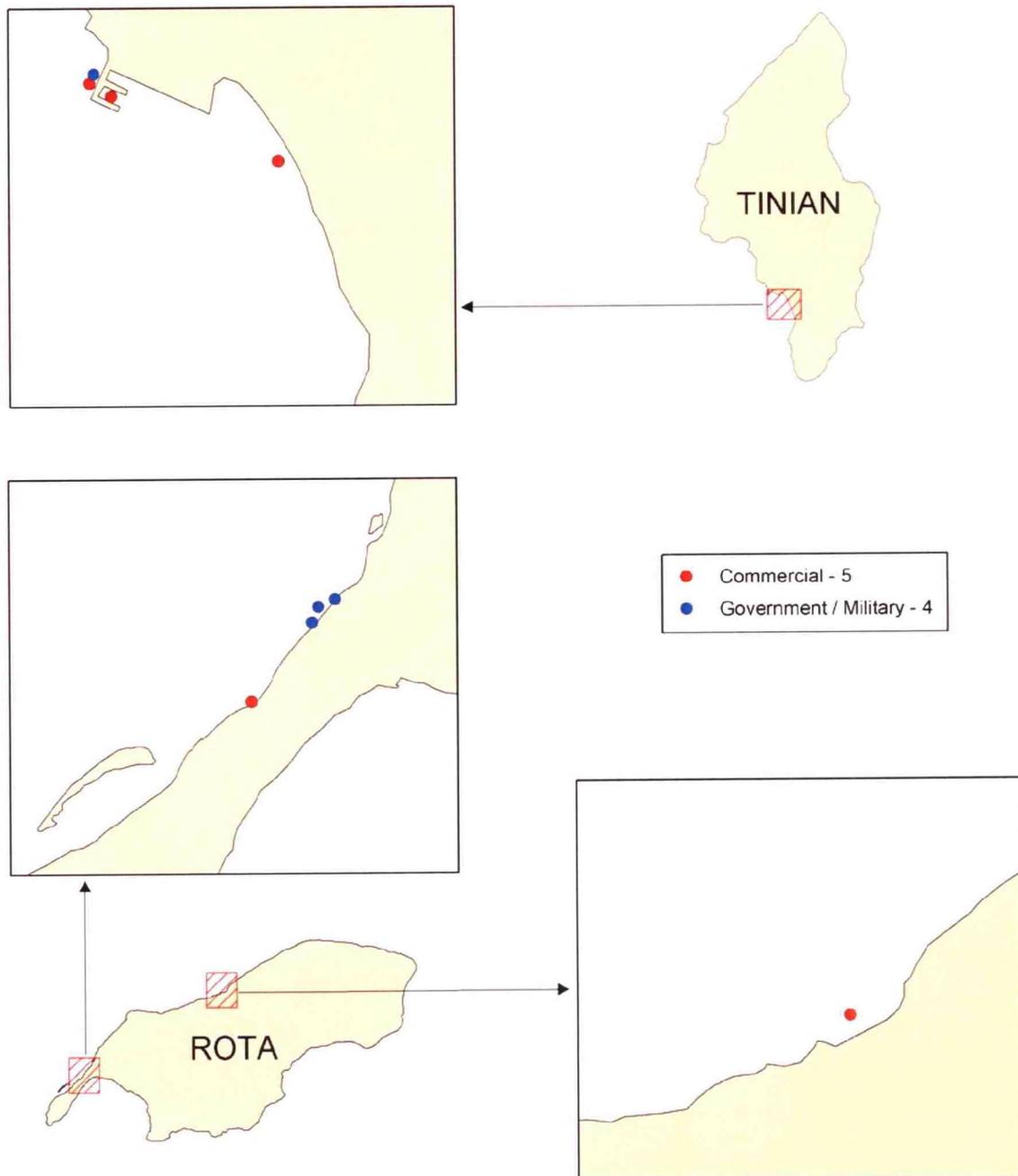


FIGURE 6. Location map showing the distribution of the 9 vessels surveyed in June 2003 in Tinian and Rota, CNMI with insets for the priority regions. The symbol color indicates the vessel type.

About one-half (15 of 31) of the vessels in Guam and almost all (39 of 42) of the vessels in the CNMI were classified as potential public health threats, mostly as slip and fall hazards because the decks were tilted or the metal deck and/or sides were rusted out. A large number of the vessels labeled as health threats are rusted out remnants of WWII era barges. On Guam, 3 vessels (Unk2525, Unk1909, and Unk1910) were noted as potential entrapment hazards to swimmers. Each of these is partially submerged or awash. On Saipan, the most notable entrapment threat is the *Samala* (Incident ID: 1252). Children have been reported playing and diving off of the wreck. In Tinian Harbor, 2 vessels (Unk2578 and Unk2579) are also entrapment threats. Both vessels are at least partially submerged and have open access to cabin space. Vessels located in industrial or restricted access areas were not classified as public health threats, based on the assumption that they were not areas where the public normally used for recreation.

COMMON VESSEL SCENARIOS

To date NOAA has reviewed and surveyed hundreds of derelict, abandoned, and wrecked vessels as part of the Abandoned Vessel Program. While each incident is unique in many ways and responding to any one of these vessels would require site specific planning and consideration, it has been noted that most vessels fall into a few broad categories. In the following pages, detailed descriptions of vessels surveyed in Guam and CNMI are organized into 5 categories in order to highlight the significant challenges in managing the vessels. The categories include:

- high removal priority for local management agencies;
- logistically complex removals because of large debris fields;
- vessels with historical significance;
- clusters of derelict and grounded vessels; and
- derelict vessels still afloat.

Each of these categories is described in detail, with an introductory page followed by plates including photos and descriptions of example vessels surveyed in Guam and CNMI. Each introductory page and set of plates is meant to be a stand-alone document, therefore some of the introductory page information is duplicated from category to category.

Abandoned Vessel Scenario: High Removal Priority for Local Management Agencies

While there may be thousands of grounded and abandoned vessels affecting coral, mangroves, and seagrass in the United States, many of these vessels can be grouped into a small number of overarching categories. This report emphasizes five:

- High removal priority for local agencies
- Vessels with historical significance
- Clusters of wrecked vessels
- Derelict vessels still afloat
- Vessels with large impacts and logistically complex removals



Prioritizing abandoned vessels for removal requires the consideration of many factors and is complex. Factors considered include but are not limited to resources at risk, vessel condition and location, and public use of the area. The importance of these individual and cumulative factors is highly dependent on the specifics of the local physical, economic, and political landscapes. As such, it is often true that the local agencies responsible for managing coastal resources have already identified vessels that they consider high priority candidates for removal.

During the 2003 vessel surveys, 1 vessel of high priority to local management agencies was highlighted and surveyed in Guam, and 3 were highlighted and surveyed in Saipan. These vessels are *Seagull*, *Samala*, *Charito*, *Nago No. 15* and are addressed in detail in Plates 1-4. In all cases, they currently pose a threat to a sensitive habitat (mangroves, coral reef, or seagrass) and/or public health and are potential sources of pollution. Other factors that increase removal priority varied with each vessel. *Seagull* is a 70 ft ketch in excellent condition. Salvaging this vessel while it is still cost effective to repair and use the vessel is critical. *Samala* is a wooden cabin cruiser that has been grounded for many years and has begun to rapidly deteriorate. Debris from the vessel has spread into seagrass and mangroves at great distances. In the future, this vessel may be further damaged and the debris wider spread by tropical storms, increasing its negative impact on the surrounding habitats. *Charito* is very close to shore in an area heavily used by the public. It is an eyesore and poses significant public health risk, while *Nago No. 15* is in the middle of a very large and healthy seagrass bed and is still in sufficient condition to float out of the area.

In 2002, the AVP surveyed *Karma* of Louis Pena Key and a cluster of three landing craft (*YFU83*, *Unk2415* and *Unk2414*) at the Naval Base Roosevelt Roads in Puerto Rico. In all cases, the local managing agency, the Puerto Rico Department of Natural and Environmental Resources, and the U.S. Navy respectively, felt that expedited removal was warranted. For more information contact the Abandoned Vessel Program at 206-526-4599 or view the website: <http://response.restoration.noaa.gov/dac/vessels/>.



PLATE 1. *The Seagull*, Sasa Bay, Guam.

Removal Scenario: High priority for removal.

Vessel Information: The *Seagull* (Incident ID: 2537) is a 70 ft recreational fiberglass sailboat that has been hard ashore since the 2002 Supertyphoon Pongsona. The vessel is in fair condition though the keel is damaged. Large mooring lines, gear, coolers, etc. remain onboard as does 128 gallons of fuel. The vessel is jointly owned by five Japanese citizens, and a local salvage firm is currently applying for removal permits.

General Site Characterization: The vessel is sitting atop a mud-draped tidal flat consisting of carbonate rubble. Landward of the vessel, an extensive stand of mangroves lines the shore. The vessel was accessed via a small trail that starts on the roadside.

Environmental Characterization: The site is part of the Sasa Bay Marine Reserve and is an important hawksbill sea turtle feeding area. Clam beds are present in the bay.

Comparison to Other Vessels/Removal Considerations: The *Seagull* is in good condition and may be usable if salvaged, as opposed to the majority of recreational vessels surveyed, which were more severely damaged. Of the vessels surveyed, this boat has the highest potential to impact mangroves. Most other vessels in mangrove habitats were WWII era steel barges that are unlikely to move or be removed.



Photographs of *Seagull* (3 June 03):

- A. View of vessel hard aground on mud-draped cobble and pebble tidal flat.
- B. View of vessel condition.
- C. View of stern.
- D. View of vessel aground in mangrove and tidal flat habitats.
- E. View of vessel from point of access at road.

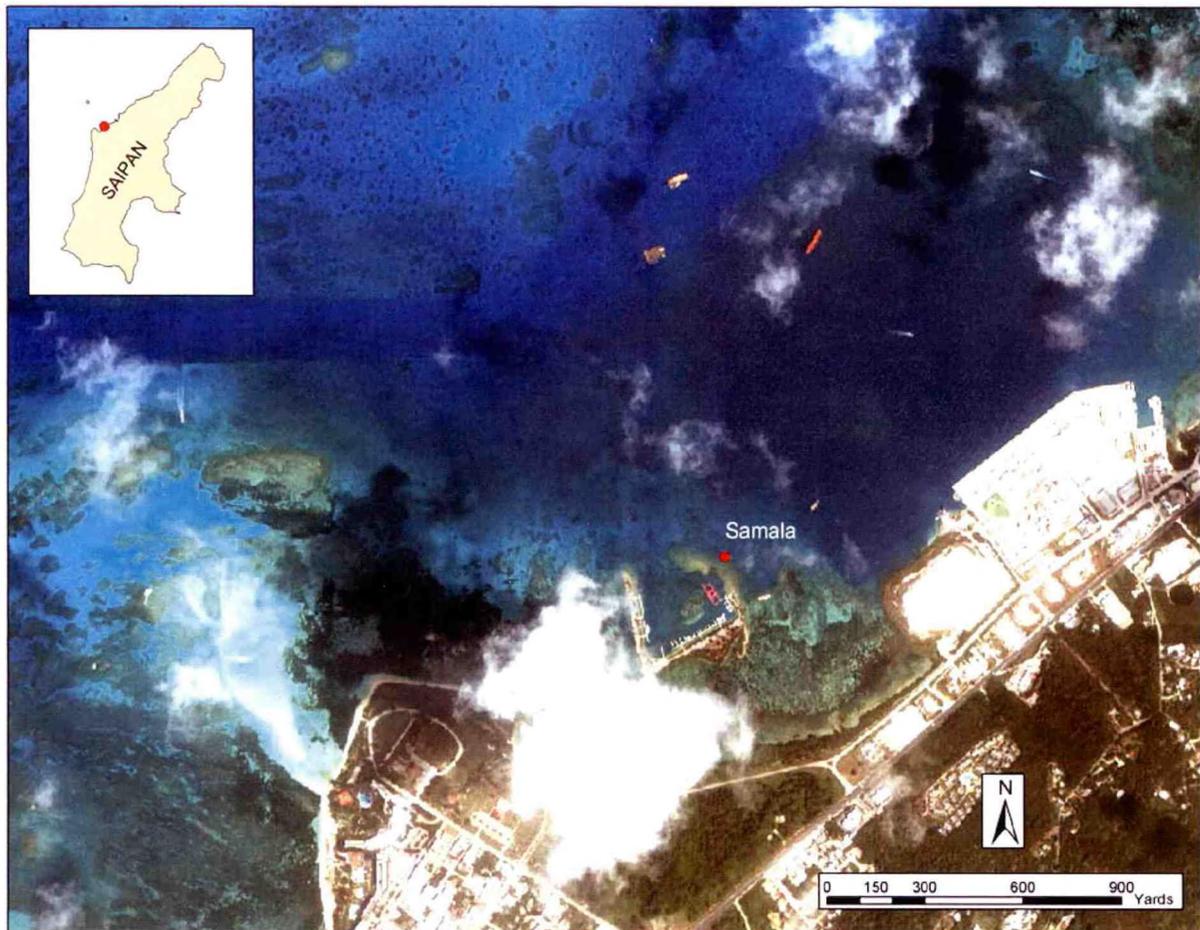


PLATE 2. *Samala*, Outer Cove Marina, Saipan.

Removal Scenario: High priority for removal.

Vessel Information: The *Samala* (Incident ID: 1251) is a 110 ft recreational wooden cabin cruiser that has been hard aground, possibly since a 1988 typhoon. The vessel is in poor and rapidly deteriorating condition. The hull has broken into multiple sections and an extensive debris field is beginning to form. Smaller, lighter debris was found washed up in the low energy back bay a long distance from the site. The vessel's fuel tanks are intact and may contain fuel. Vessel ownership is unknown.

General Site Characterization: The vessel is aground in a sheltered lagoon setting in about 3 ft of water. The site was accessed from roads associated with the nearby park and marina.

Environmental Characterization: Coral and macroalgae are the primary benthic habitat types. Live coral cover ranging from 0-10% was observed within 60 ft of the vessel. Denser coral coverage (50-70%) occurs 60+ ft from the vessel. Some massive coral heads adjacent to the vessel were >5 ft wide and 2-3 ft tall. Dense macroalgae (*Halimeda macroloba*) (50% cover) was observed in some areas. Seagrass beds are present approximately 75 ft from the vessel.

Comparison to Other Vessels/Removal Considerations: This was the only vessel surveyed that was constructed largely of wood and is deteriorating at a great rate. Of the vessels characterized as “high priority for removal”, the *Samala* appears to be having the most noticeable impact on surrounding coral reef habitats.



Photographs of *Samala* (5 June 03):
 A. View from access point at Outer Cove Marina.
 B. View of wooden cabin deterioration.
 C. View of debris on *Porites* coral head immediately adjacent to vessel.
 D. Compressed gas tanks observed in debris.
 E. View of *Acropora* and damselfish near vessel.

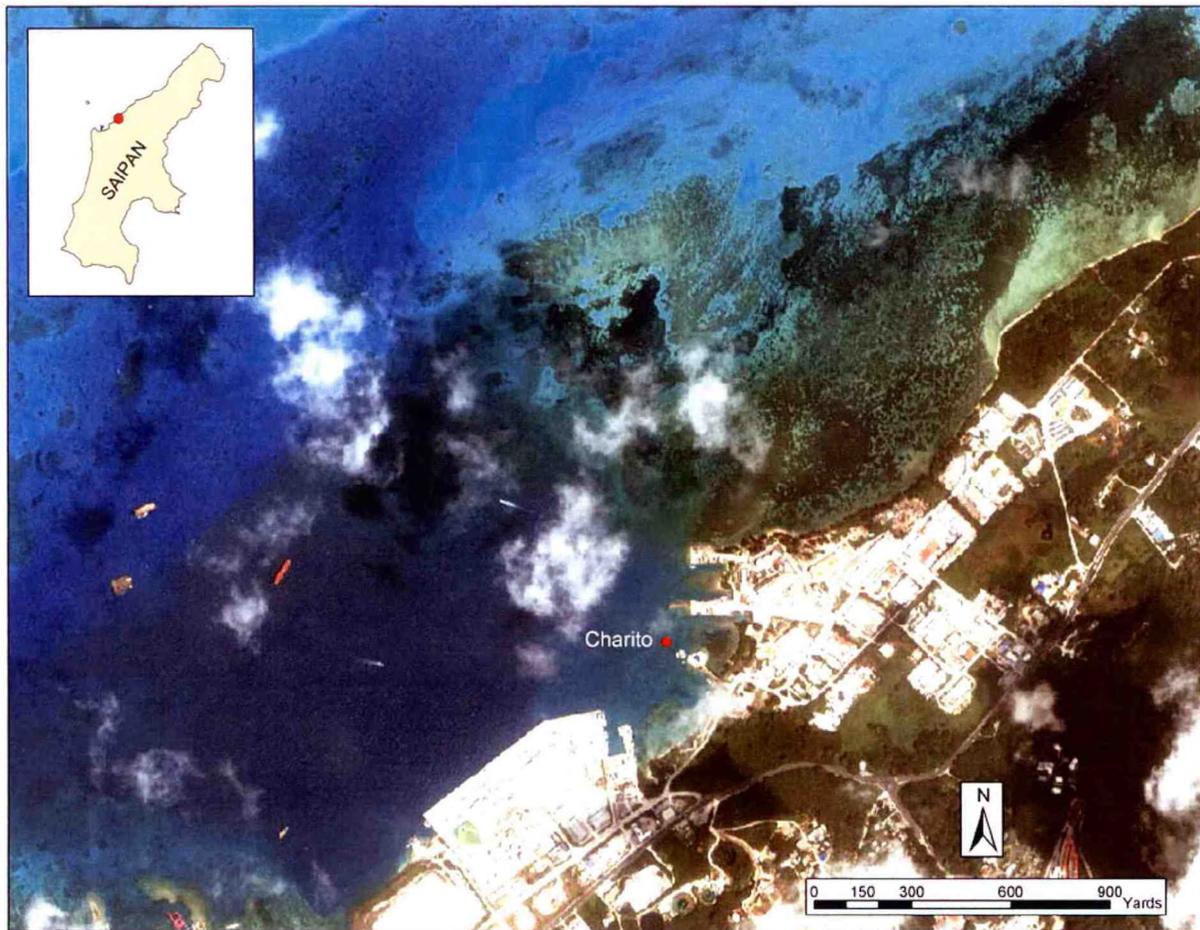


PLATE 3. *Charito*, Lower Base, Saipan.

Removal Scenario: High priority for removal.

Vessel Information: The *Charito* (Incident ID: 1252) is a 97 ft steel commercial longliner that went aground during a storm. The vessel is intact, although it is beginning to rust heavily. The vessel's ownership is unknown.

General Site Characterization: The vessel is aground in a sheltered, industrial lagoonal setting in about 5 ft of water. The site was accessed from a road adjacent to the shore.

Environmental Characterization: Coral, macroalgae, and minor amounts of seagrass were observed near the vessel. Directly surrounding the vessel live coral cover was 0-10% while 30 to 45 ft away there were some patch reefs with higher species diversity and live coral cover (10-30%). The substrate was sandy with up to 50% algal cover and patches of seagrass.

Comparison to Other Vessels/Removal Considerations: The vessel is located in a high use recreational fishing, boating, and birding area. A small boat launch and anchorage are located 500 ft from the vessel. Local officials view the vessel as an eyesore and potential threat to other boats/facilities if it were to move during a storm. They are very interested in removing it.



Photographs of Charito (5 June 03):
A. View from shore of bow.
B. View of coral (*Porites* and *Acropora*) and macroalgae at site.
C. View of stern and proximity to shore.
D. View of macroalgae (*Halimeda macroloba* and *Caulerpa taxifolia*) and seagrass (*Enhalus macroroides*) near vessel.

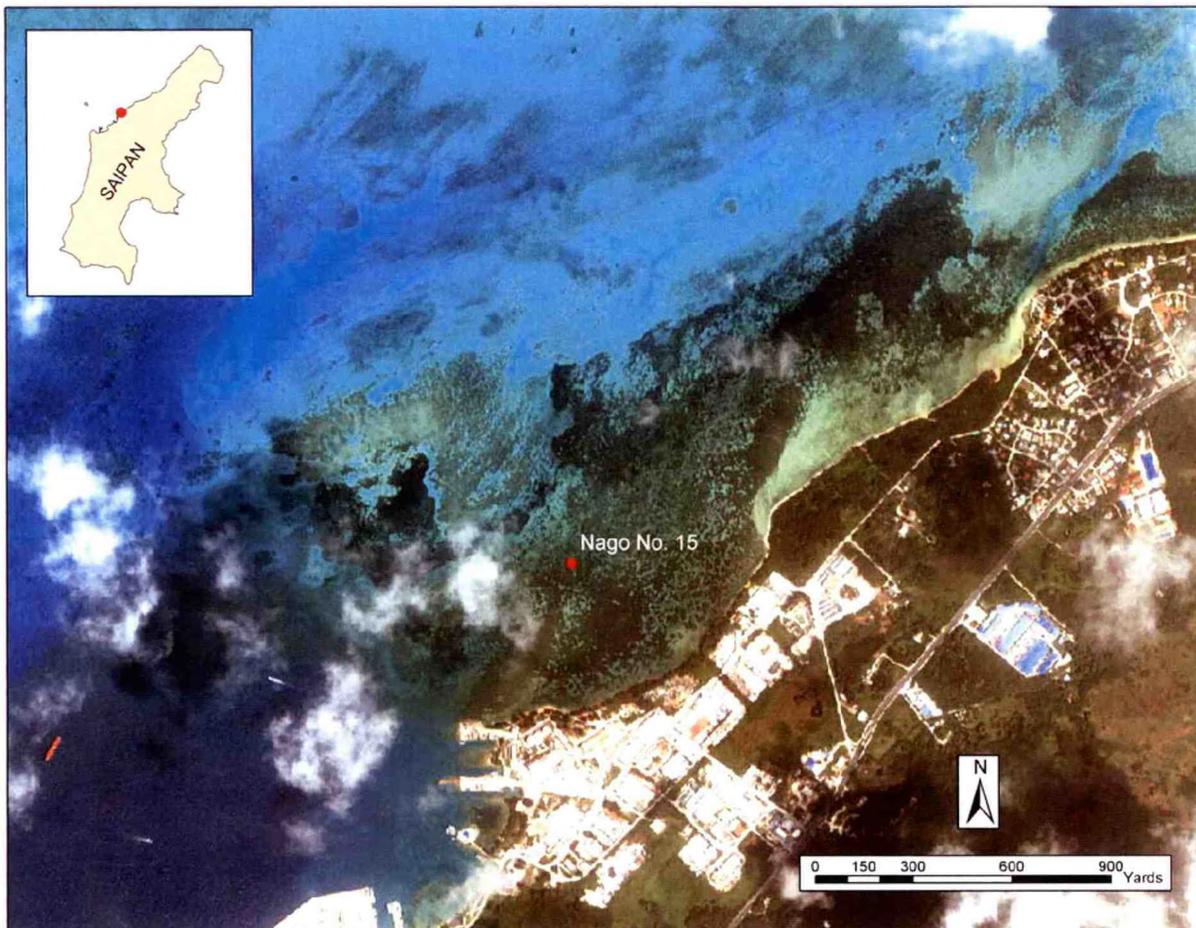


PLATE 4. *Nago No. 15*, Saipan Lagoon, Saipan.

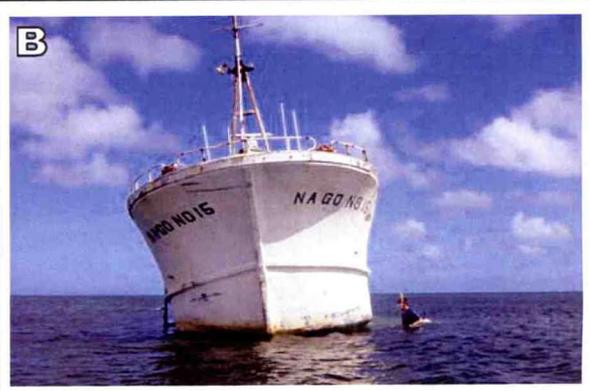
Removal Scenario: High priority for removal.

Vessel Information: The *Nago No. 15* (Incident ID: 1253) is a 53 ft fiberglass commercial longliner that grounded during a storm. The vessel is intact though the steel portions are beginning to rust. Ownership is unknown.

General Site Characterization: The vessel is aground in a shallow lagoonal setting in 3 to 5 ft of water. The site is accessible from a road adjacent to the shore or by boat.

Environmental Characterization: Dense seagrass, (>70% cover, 90-100% cover in some areas) and a sandy substrate. Scouring has occurred off of the port side (8 ft swath) and bow (20 ft swath).

Comparison to Other Vessels/Removal Considerations: Seagrass coverage surrounding the vessel was denser and covered a more extensive area than in all other areas surveyed in Guam and CNMI. Previous attempts to remove the vessel failed, but our survey assessment indicated that removal would probably be feasible if performed by experienced personnel.



Photographs of *Nago No. 15* (6 June 03):
A. View of stern.
B. View of bow.
C. Unvegetated scour area that extends 8-20 ft off of port side and bow.
D. Engine compartment in vessel.
E. Dense seagrass habitat adjacent to the vessel.

Abandoned Vessel Scenario: Logistically Complex Removals because of Large Debris Fields.

While there may be thousands of grounded and abandoned vessels affecting coral, mangroves and seagrass in the United States, many of these vessels can be grouped into a small number of overarching categories. This report emphasizes five:

- High removal priority for local agencies
- Vessels with historical significance
- Clusters of wrecked vessels
- Derelict vessels still afloat
- Vessels with large impacts and logistically complex removals



Vessels exposed to high-energy environments for long periods of time frequently break up into many pieces, creating large and potentially mobile debris fields. These vessels may pose an increased threat to coral and hardbottom habitats because the vessel fragments can roll across the bottom breaking corals, crushing benthic organisms, filling in gaps and generally reducing the structural complexity of the environment. This scattered wreckage also presents unique removal challenges since locating and removing all of the pieces requires increased man-hours and additional salvage equipment.

The vessels displayed in Plates 5 and Plate 6 (the *Sun Long No. 8* and the #62 *Nam Sung* respectively) both fall into this category. The *Sun Long No. 8* is a steel Korean freighter that was grounded in Tinian Harbor in 1987 by Super typhoon Kim. Since the event, the vessel has broken into hundreds of pieces that now rest among corals. Initially, the reef was damaged in 1987 by the grounding event and salvage attempts. The rubble, however, continues to damage the reef 16 years later. For increased clarity, the plate has a debris field map in addition to photos of the wreckage. The #62 *Nam Sum* is a large Korean fishing vessel that grounded on Sasanlago-Tatqua Beach, Rota in 1982 and is similar to the *Sun Long No. 8*. This vessel rests on the reef crest of a pristine spur and groove reef with extensive coverage of large corals.

While these vessels are extreme examples, the cost and complexity of any removal increases as the vessel breaks up into many pieces. Much smaller vessels can present similar problems. The *Samala* (already addressed in Plate 2) is a prime example. Its debris field already stretches for many yards in every direction. Additionally, some of the more mobile fragments were located up to a half mile from the vessel, washed up in mangrove and seagrass habitat. The 2002 Caribbean surveys provide another smaller scale example. The sloop *Karma* was sunk in the waters off Luis Pena Key, PR within 75 ft of a healthy coral reef. When managing agencies first attempted to gain authority to remove the vessel, it was intact and the operation would have been brief and inexpensive. As legal issues interfered with determining clear authority and delayed action, the vessel has broken into many pieces that are more mobile, harder to locate, and more costly to remove.

For more information contact the Abandoned Vessel Program at 206-526-4599.
<http://response.restoration.noaa.gov/dac/vessels/>.

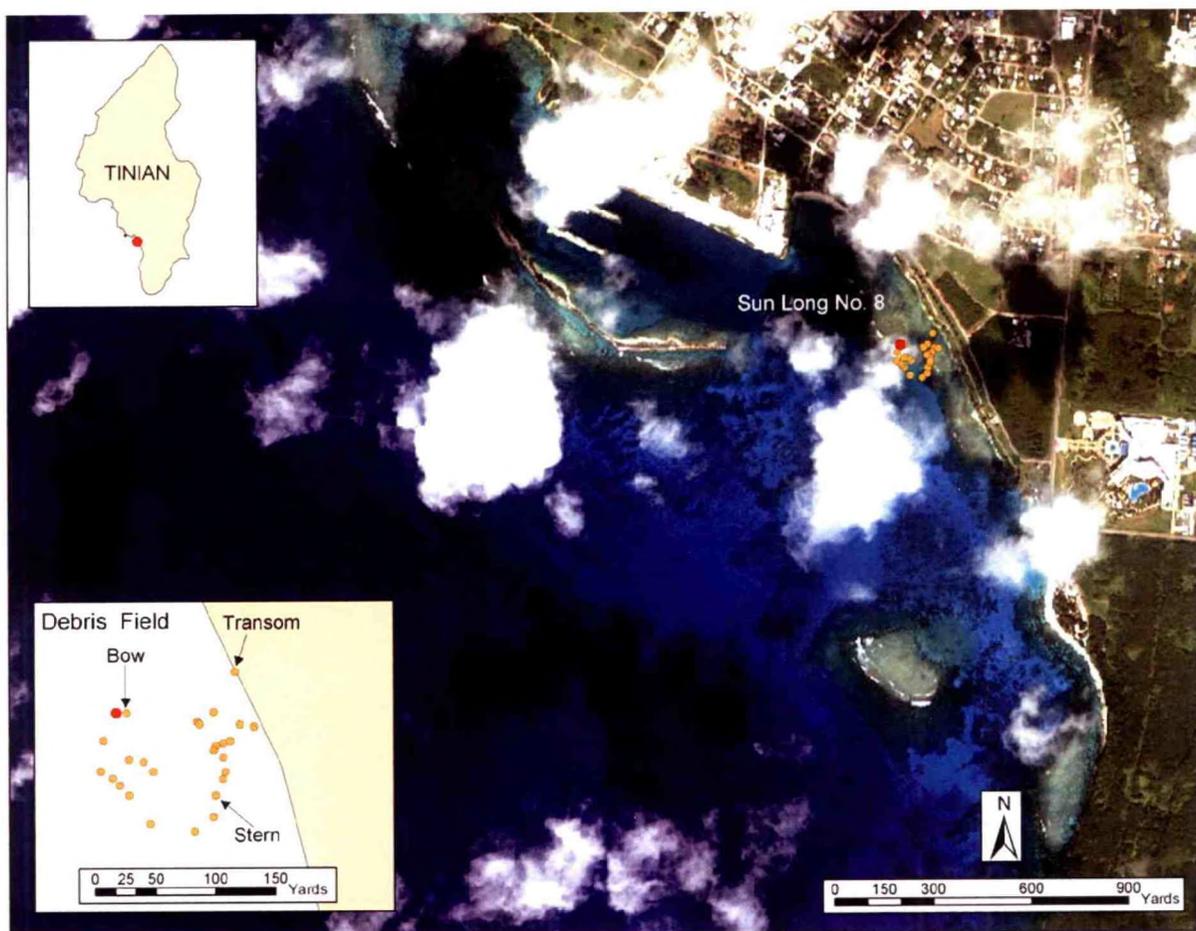


PLATE 5. *Sun Long No. 8*, Tinian Harbor, Tinian.

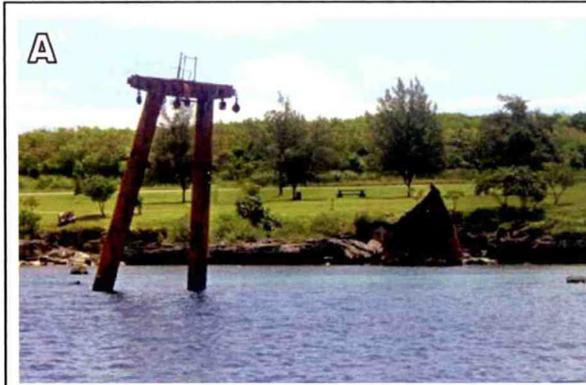
Removal Scenario: Logistically complex due to extensive debris field.

Vessel Information: The *Sun Long No. 8* (Incident ID: 1828) is a 325 ft Korean commercial steel freighter. It has been hard aground since Supertyphoon Kim in 1987. The vessel is largely broken up and parts are scattered throughout the reef from depths of 0 to 25 ft. The kingposts and engine block protrude from the water and a large stern section remains on the beach, making the vessel clearly visible. Ownership of the vessel is unknown.

General Site Characterization: The vessel is in a moderately exposed portion of Tinian Harbor and is accessible via nearby roads and by boat. The adjacent shoreline is somewhat rocky with pocket beaches.

Environmental Characterization: The primary habitat type is coral reef/hardbottom. There is some rubble surrounding the vessel with live coral ranging from <10% to ~10-30% cover. The reef is very close to the bow (~20% live cover) but is ~45 ft off of the port and starboard sides.

Comparison to Other Vessels/Removal Considerations: This is one of two sites that had extensive debris fields over a range of depths. *Sun Long No. 8* is one of the largest vessels surveyed at 325 ft.



Photographs of *Sun Long No. 8* (9 June 03):

- A. Kingpost and large piece of debris on shore.
- B. View of large piece of debris on riprap shoreline.
- C. View of dense debris.
- D. Small portion of debris field and sand and gravel substrate with coral rubble.
- E. Anchor among the debris atop sand and gravel.

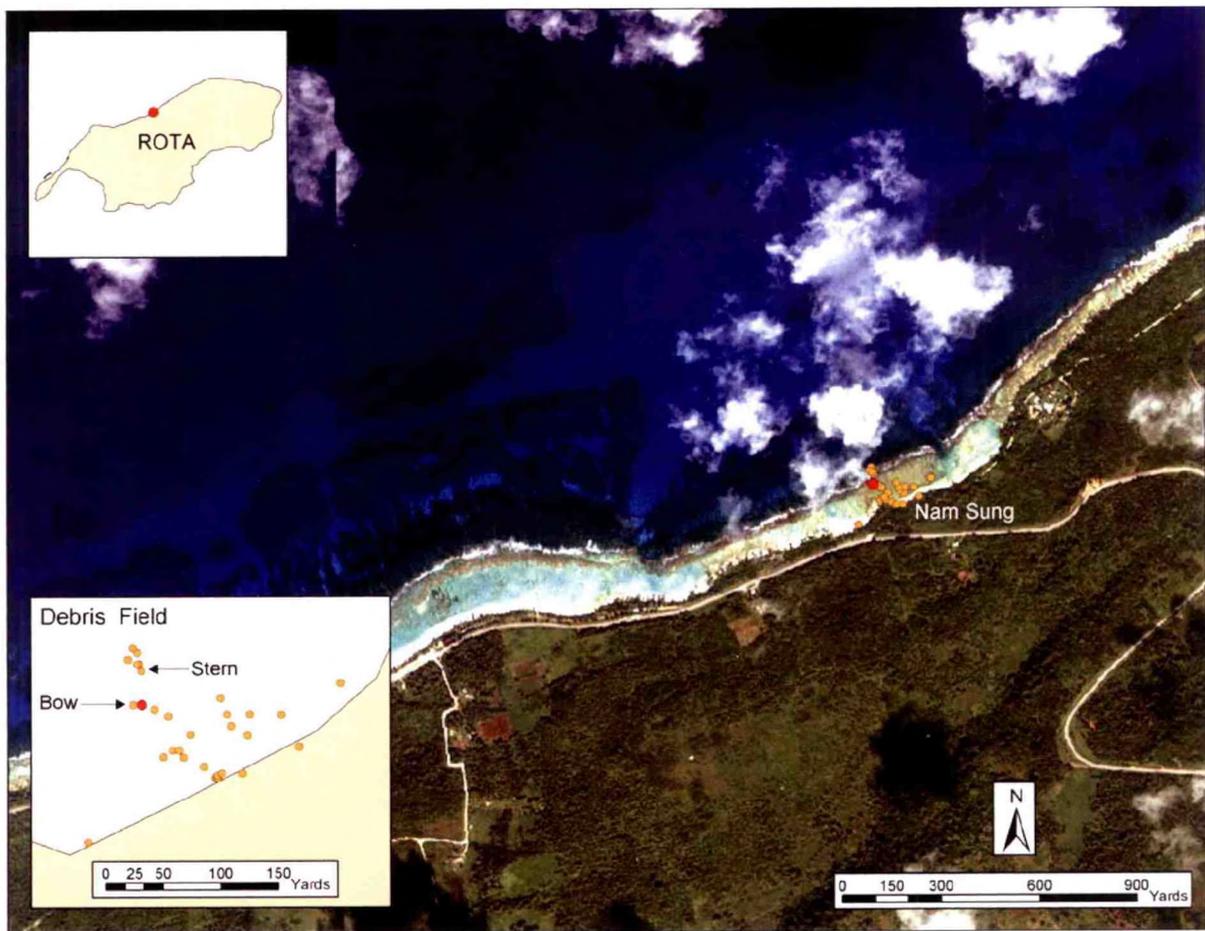


PLATE 6. #62 *Nam Sung*, Sasanlago-Tatqua beach, Rota.

Removal Scenario: Logistically complex due to extensive debris field.

Vessel Information: The #62 *Nam Sung* (Incident ID: 1828) is a 63 ft Korean commercial steel fishing vessel. Originally it was 42.5m (~140 ft) in length but is has since broken up. It has been hard aground since July of 1982. One large section of the hull rests on the reef, and debris is scattered from the edge of the reef to the beach. The vessel is owned by Nam Sung Fisheries Co., Ltd. of Busan, Korea.

General Site Characterization: Exposed reef flat with waves breaking on the reef and vessel. Adjacent shoreline consists of some rock but mostly extensive beaches.

Environmental Characterization: Vessel and majority of debris rest on shallow exposed reef flat with 0% live coral and some attached algae in surf zone. Seaward of reef flat ~60 ft from main vessel is an extensive spur and groove reef with 50-70% live coral or greater in some areas. Some debris lies among spur and groove reef. Dominant genres include: *Porites*, *Acropora*, and *Pocillopora* with multiple species/forms observed for each genus. Additional genres likely occur in the area. Reef fish and giant clams observed.

Comparison to Other Vessels/Removal Considerations: One of two sites that had extensive debris fields, this site has debris spread over the greatest area. Heavy surf in shallow area may impede removal. This area had the highest coral species diversity of all areas surveyed in the Pacific region.



Photographs of *Nam Sung* (10 June 03):

- A. View of the vessel from the point of access at road.
- B. A portion of the exposed lagoonal debris field.
- C. A large piece of engine debris among the coral rubble; note the breaking waves.
- D. Propeller and other debris in shallow water
- E. Large coral head less than 30 ft seaward of the portion of the hull in A.

Abandoned Vessel Scenario: Vessels with Historical Significance

While there may be thousands of grounded and abandoned vessels affecting coral, mangroves and seagrass in the United States, many of these vessels can be grouped into a small number of overarching categories. This report emphasizes five:

- High removal priority for local agencies
- Vessels with historical significance
- Clusters of wrecked vessels
- Derelict vessels still afloat
- Vessels with large impacts and logistically complex removals



While many abandoned and derelict vessels are strictly environmental, human-health, or economic problems that must be mitigated or removed, there is a subset that contains vessels that hold significant information about our past. These vessels deserve special consideration and may be protected by the National Historic Preservation Act (NHPA). Examples include the classic shipwrecks from 15th through the 19th centuries. Ships sunk during World War I or World War II may also fall into this category. Protection under the NHPA does not mean that removing or mitigating one of these vessels is absolutely prohibited. It does mean, however, that if the vessel in question is on or is eligible to be on the National Register of Historic Places then any federal action related to the vessel is subject to a heightened level of review. The State Historic Preservation Officer and the Advisory Council on Historic Preservation would both be involved to ensure that proper attention and protection was provided to all significant historic resources. Many sunken vessels along the shores of Saipan are from the World War II era and might have historical significance. Plate 7 describes a collection of twenty WWII barges that were surveyed in the vicinity of Outer Cove Marina. To a large degree, these vessels are immobile and in some cases they are serving as substrate for live coral growth. These barges are in an advanced state of deterioration, consisting in some cases of only a rusting framework. As such they may pose a risk to public safety but they are not threatening the natural resources. It is also important to note that similar barges were noted in other places on the island. Because of logistical restrictions they were not surveyed, but they closely resembled these twenty.

Plate 8 focuses on three U.S. Military "M-boats" (*T.T. Gov't 1*, *T.T. Gov't 2* and Unk2581) beached in Sasanlago, Rota. Like the barges in Plate 7, these vessels were used during WWII, but these vessels were moved into inter-island service after the war and grounded on this beach in the 1960s. The AVP found other examples of this in Apra Harbor, Guam where there were four other WWII era landing craft that were abandoned after service in the private sector (*Guahan 1*, *Guahan 2*, Unk1909, and Unk2529). Also described in Plate 8 is Unk2545, a Japanese freighter that was either sunk during WWII or between WWI and WWII.

For more information contact the Abandoned Vessel Program at 206-526-4599 or view the website: <http://response.restoration.noaa.gov/dac/vessels/>.

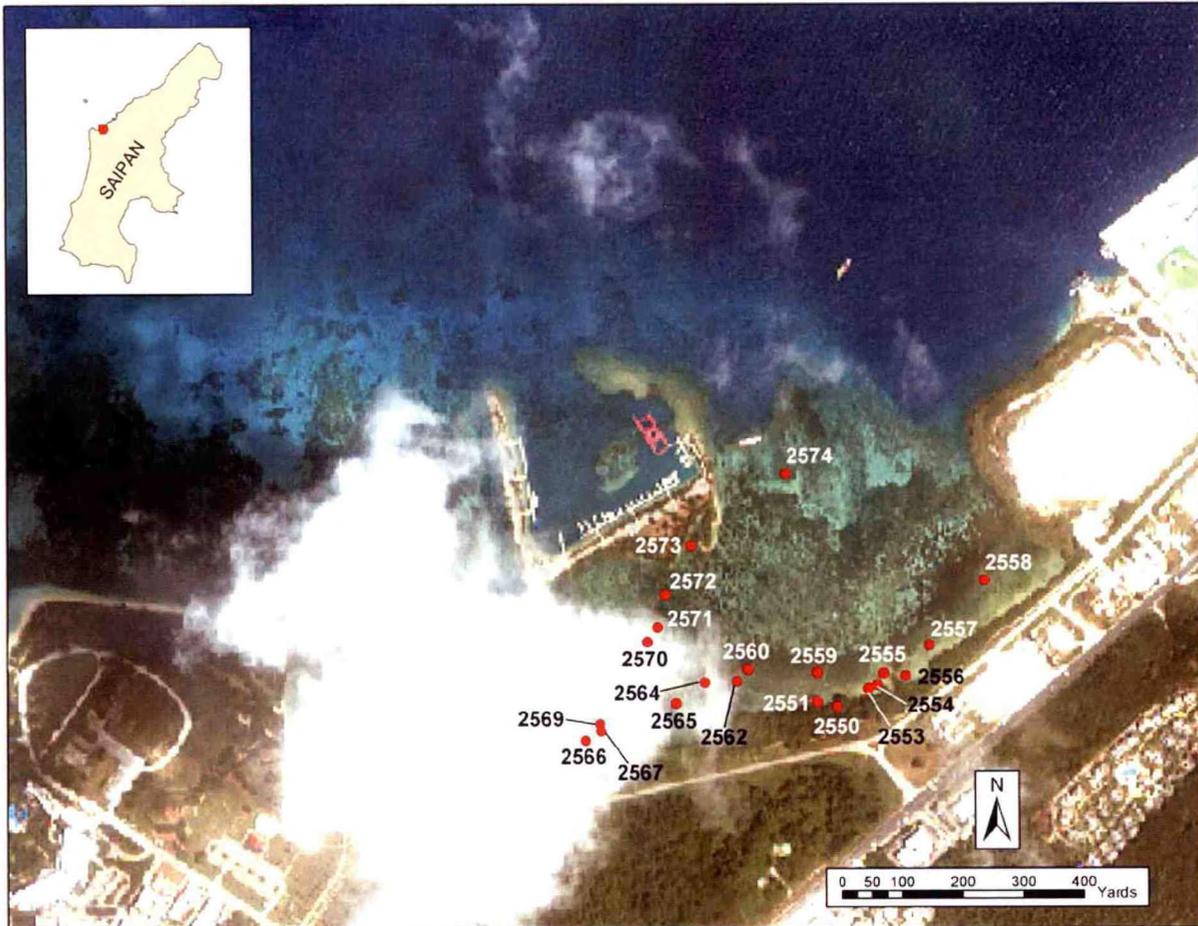


PLATE 7. Barges, Outer Cove Marina, Saipan.

Removal Scenario: Historical considerations.

Vessel Information: Barges such as the ones indicated above make up over half of the WWII era wrecks surveyed on all the islands. These vessels are old supply barges and have presumably been aground since shortly after WWII, roughly fifty years or more. The barges have largely broken down to a rusting frame with little debris. Most vessels are mired or incorporated deeply within the substrate/habitat (sand, reef rock, mangroves etc.). Typically the barges are awash and may protrude 1-2 ft above the water line.

General Site Characterization: WWII era barges are found in a variety of settings but in general they are found in shallow (1-4 ft) sheltered areas, close to the shoreline (easily accessible).

Environmental Characterization: Found in a variety of settings including shallow coral reef, seagrass/macroalgae beds, mangroves, and sandy bottom lagoons.

Comparison to Other Vessels/Removal Considerations: Of the historical vessels surveyed, these are the most widespread type, but also appear to be the most deeply entrenched. While they may have historical value, there are large numbers of these vessels present that are rusted and of a nondescript nature.



Photographs of typical WWII barge sites (June 03):

- A. View of a typical barge; note mangroves growing in vessel.
- B. A typical barge; note very low relief with respect to the water line.
- C. Macroalgae and sandy bottom typical of the barge survey sites.
- D. Macroalgae and sparse seagrass typical of the barge survey sites.
- E. Seagrass and sandy bottom habitat near Saipan barges.

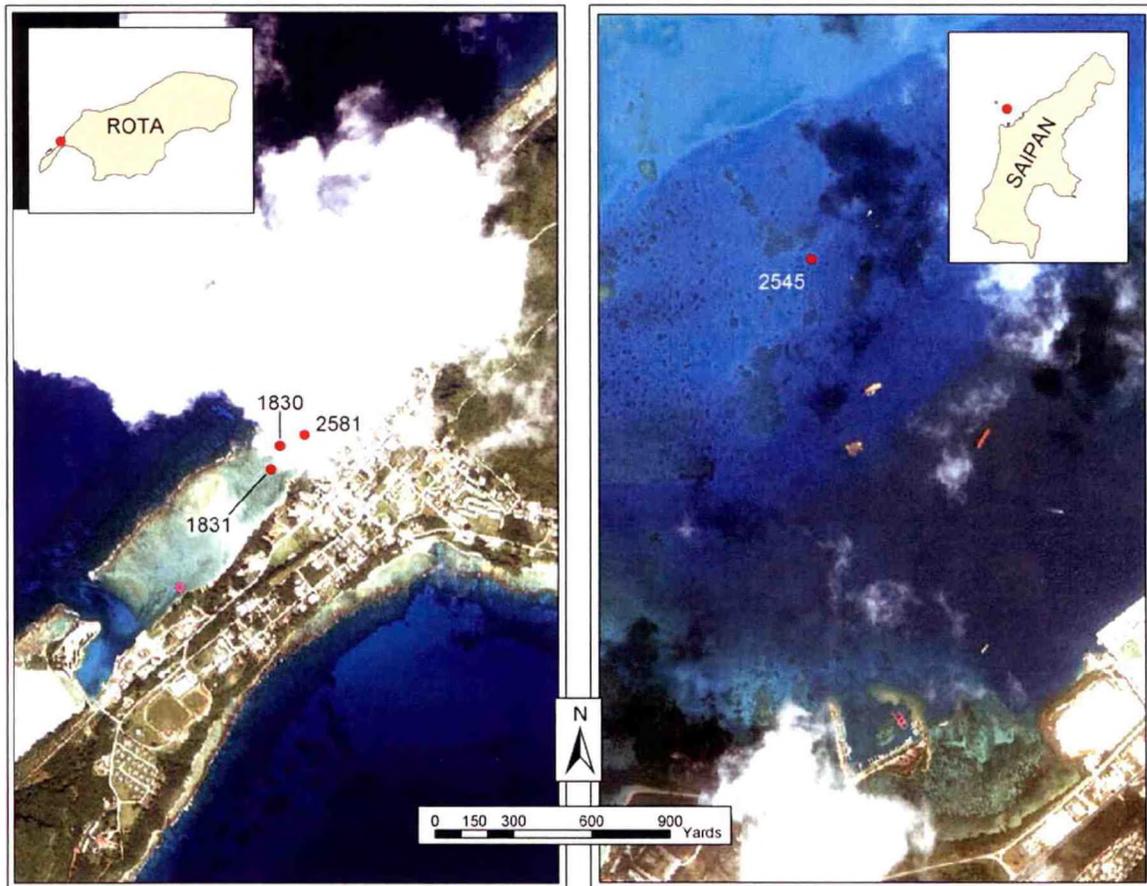


PLATE 8. Additional historic vessels in the CNMI – Three "M-boats" and a Japanese freighter.

Removal Scenario: Historical considerations.

Vessel Information: Three U.S. Military "M-Boats" (Unk1830, Unk1831, Unk2581) were surveyed on Rota. These vessels were used as ferries to haul equipment ashore and may be valuable examples of WWII era landing craft Unk2545; a Japanese freighter was surveyed on Saipan and was sunk either during WWII or between WWI and WWII.

General Site Characterization: The M-Boats were found in shallow (1-4 ft) lagoonal areas, close to the shoreline (easily accessible). The Japanese vessel was found in further offshore in ~35 ft of water.

Environmental Characterization: The M-boats rest in shallow lagoons dominated by coral rubble and the Japanese vessel is in deeper water with sand and gravel bottoms. Live coral cover is typically low.

Comparison to Other Vessels/Removal Considerations: The M-Boats and Japanese vessel are much larger than the majority of WWII barges surveyed (See Plate 7). There is relatively little debris associated with the M-Boats, which are deeply entrenched like many of the WWII era barges that were surveyed. Unk2545 has deteriorated to an extensive debris field with a few pieces that closely approach the surface.



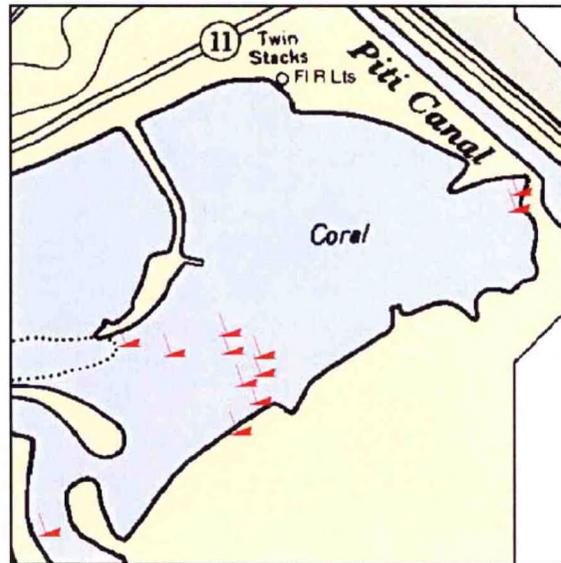
Photographs of M-boats and Shaoan Maru (6-10 June 03):

- A. View of starboard side of *T.T. Gov't 1* (Incident ID: 1830).
- B. Wreckage from *T.T. Gov't 2* (Incident ID: 1831).
- C. Debris and coral rubble at *T.T. Gov't 2* site (Incident ID: 1831).
- D. A small portion of Unk2545.
- E. The bow of the Unk2545 on sand and gravel bottom.

Abandoned Vessel Scenario: Clusters of Derelict and Grounded Vessels.

While there may be thousands of grounded and abandoned vessels affecting coral, mangroves and seagrass in the United States, many of these vessels can be grouped into a small number of overarching categories. This report emphasizes five:

- High removal priority for local agencies
- Vessels with historical significance
- Clusters of wrecked vessels
- Derelict vessels still afloat
- Vessels with large impacts and logistically complex removals



In 2002 and 2003 the Abandoned Vessel Program surveyed 11 islands and 176 vessels. As this work was performed, it was noted that wrecked and derelict vessels are not evenly distributed but often are concentrated in small areas. Plates 9 and 10 illustrate two such areas in Guam. Plate 9 depicts a cluster of thirteen vessels in close proximity in Piti Channel. These vessels range in size from Unk2523, a small 21 ft sailboat, to *Guahan-1*, a 100 ft landing craft. They are both commercial (3 landing crafts, 2 longliners, 1 barge and 1 salvage vessel) and recreational (6 sailboats). The threats posed by these vessels vary as well. In this case, a number of the boats pose navigation hazards, and at least 1 is a potential pollution threat. Additionally, of most interest in this context is the attraction to boat owners to continue to abandoned vessels at the site. With so many vessels in one place, some of which have obviously been there for a long period, there can be a perceived acceptance by local officials to allow vessel disposal in the area.

Plate 10 details 6 vessels that are currently grounded or sunk in Agana Boat Basin. These vessels, all recreational craft, were previously moored in the basin and were damaged and/or sunk by severe tropical weather. Three are addressed in greater detail in Plate 12 because they were identified as vessels at risk prior to grounding or sinking.

Puerto Rico and the USVI had more examples of these clusters. Three such groups that were surveyed are Boqueron Bay, PR (8 vessels), Benner Bay, St. Thomas (~20 vessels) and the Salt River Estuary, St. Croix (~20 vessels).

For more information contact the Abandoned Vessel Program at 206-526-4599 or view the website: <http://response.restoration.noaa.gov/dac/vessels/>.



PLATE 9. Piti Channel, Guam.

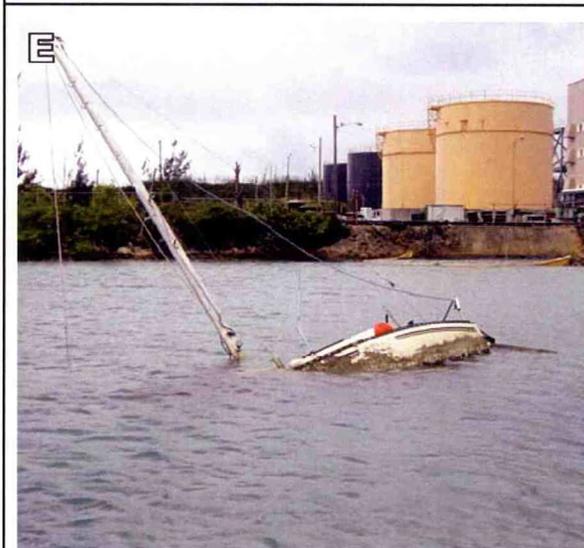
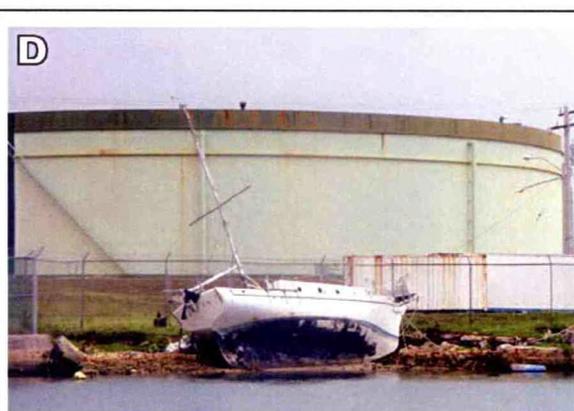
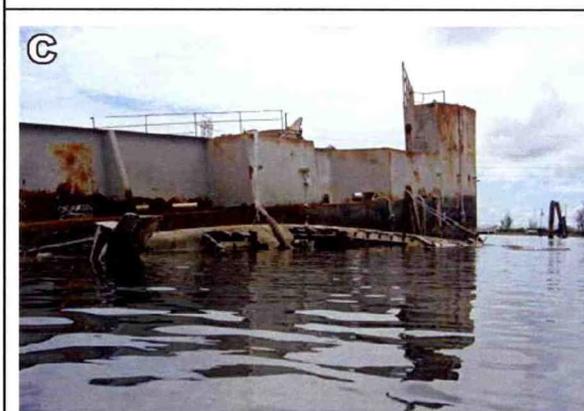
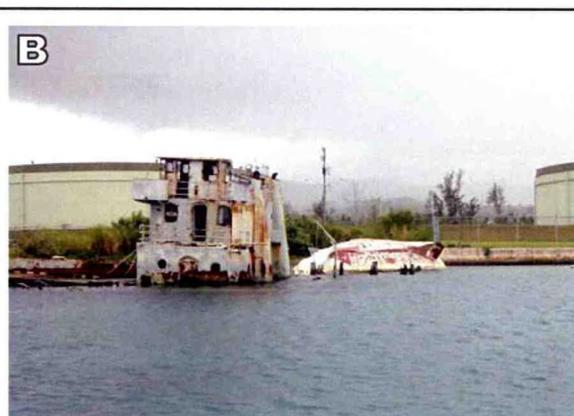
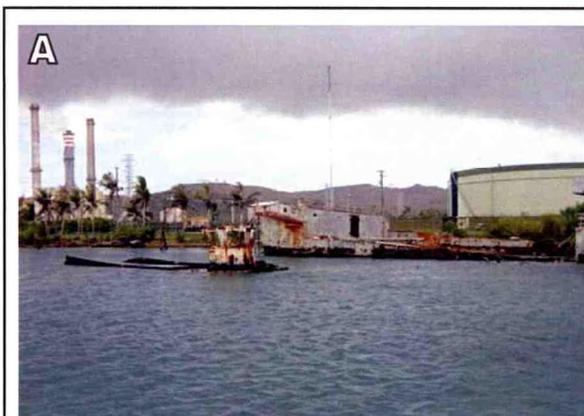
Removal Scenario: Cluster of vessels.

Vessel Information: The cluster shown above consists of 14 vessels (note Incident IDs on Plate), most within roughly 150 ft of another. Vessel types ranged from recreational sailboats to commercial landing craft. Some of the vessels have sunk or run aground as recently as 2002 while others have been abandoned since the mid 1980s.

General Site Characterization: The vessels of this cluster are found in 0-12 ft of water and are relatively close to the shoreline and easily accessible by boat. Adjacent land is owned and managed by the Government of Guam and Guam Port Authority. The area is partially industrial with warm effluent being released from the adjacent power plant. The channel is primarily used for navigation and fishing.

Environmental Characterization: Piti Channel in Inner Apra Harbor consists of sandy bottom channels rimmed with vegetated banks (in some cases mangroves) and relatively narrow sand and gravel beaches. One of the vessels in this cluster is aground on a sand and gravel beach and the others rest on a sand bottom. The area is part of the active harbor and therefore contains a mix of engineered and natural shoreline.

Comparison to Other Vessels/Removal Considerations: These vessels are in one of the tighter “clusters” found in the survey. These types of areas often become dumps for abandoned vessels, and several similar areas were surveyed in the U.S. Caribbean. None of these vessels are a pollution threat but all are threats to navigation.



Photographs of Apra Harbor vessel cluster (2 June 03):

- A. View to the SE from within the Piti Channel towards Unk1906 (foreground) and *Gauhan-2* (back).
- B. Photo taken just west of image A, showing *Chamorro-1* (right) and its proximity to *Gauhan-2* (left).
- C. Unk2527 (foreground) lying against the starboard side of *Gauhan-2*.
- D. *Merlin* aground just southwest of *Chamorro-1*; note the seawall and storage tank in both image B and D.
- E. *Dolphin Dancer*, photo taken just north of other vessels.

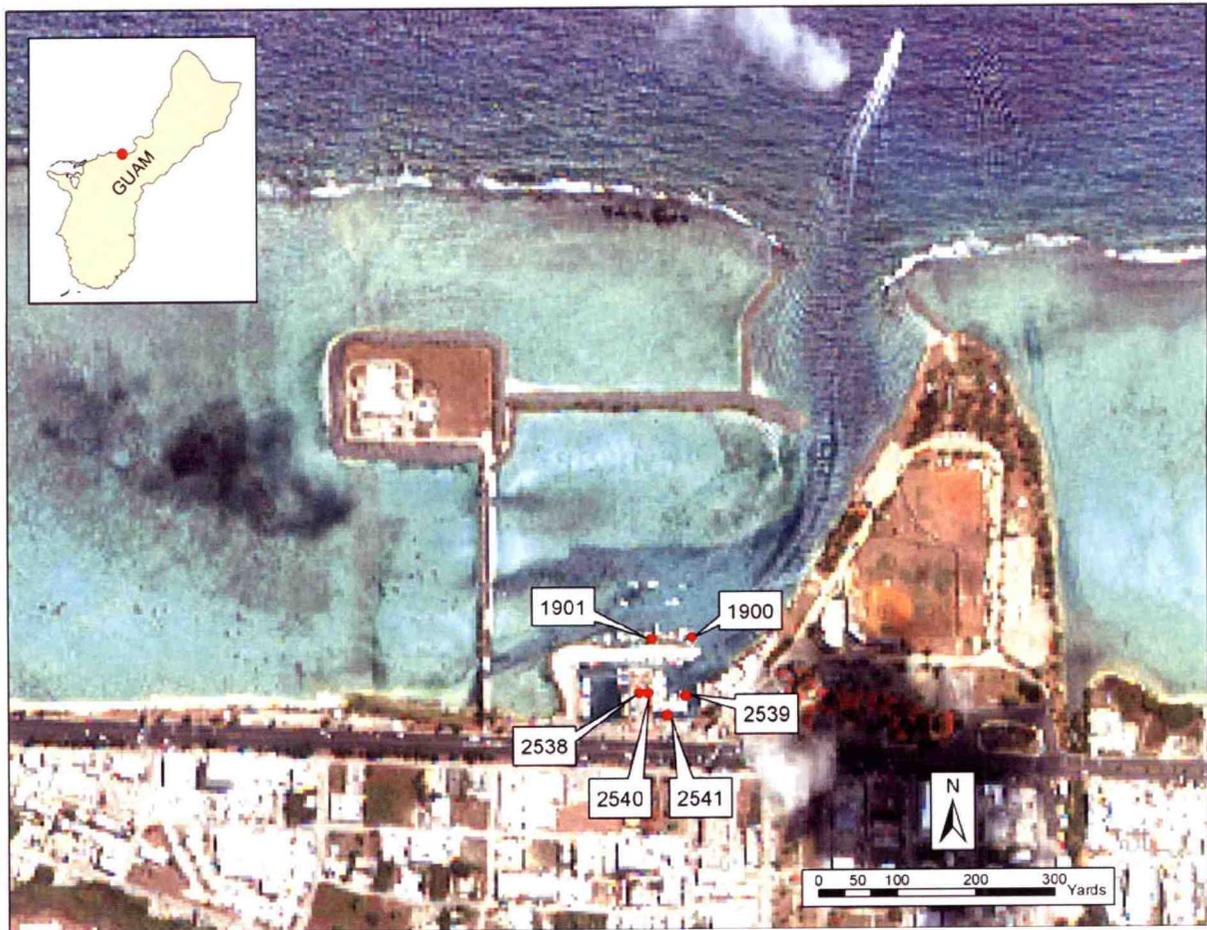


PLATE 10. Agana Boat Basin, Guam.

Removal Scenario: Cluster of vessels.

Vessel Information: The cluster shown above consists of 6 vessels (note incident IDs on Plate) within an area no more than 230 ft across. All vessels were recreational or charter sailing boats and were casualties of the 2002 storm Pongsona. The vessels range from being grounded along the shoreline to sunk in the mooring field in >10 ft of water.

General Site Characterization: The site is a mooring area with an access road. The area is very sheltered. The shoreline has been engineered, using minor amounts of riprap. The rest of the shoreline is vegetated with a narrow gravel beach.

Environmental Characterization: Five vessels in this cluster rest on sand and gravel substrate. One is aground on a gravel beach. There were minor amounts of live coral and macroalgae observed at the site.

Comparison to Other Vessels: These vessels are in one of the tighter “clusters” found in the survey. One of these vessels (*Lion’s Den*, Incident ID: 1901) is a pollution threat and one (Unk1900) is a threat to navigation. These vessels could also threaten other vessels moored in the area if they were to move in a storm. Vessels clustered in mooring areas following hurricanes were also common in the U.S. Caribbean.



Photographs of Agana Boat Basin vessel cluster (4 June 03):

- A. *Lion's Den*, Incident ID: 1901.
- B. *Windsong*, Incident ID: 2538; note close proximity to shore.
- C. Unk1900, located just east of *Lion's Den*.
- D. Unk2539, also close to shore.
- E. *Ciao*, Incident ID: 2541.

Abandoned Vessel Scenario: Derelict Vessels Still Afloat

While there may be thousands of grounded and abandoned vessels affecting coral, mangroves and seagrass in the United States, many of these vessels can be grouped into a small number of overarching categories. This report emphasizes five:

- High removal priority for local agencies
- Vessels with historical significance
- Clusters of wrecked vessels
- Derelict vessels still afloat
- Vessels with large impacts and logistically complex removals



Derelict and abandoned vessels that remain afloat present a critical management challenge. In most cases these vessels have not yet impacted natural, recreational, or commercial resources. However, as they deteriorate, the likelihood increases that they may sink or break free from their moorings. At this point their impacts can become significant. Vessels may crush benthic habitats, leak fuel and other hazardous materials onboard, or break into pieces that are difficult to recover and continue to damage the bottom for years. Additionally, it is much more cost effective to remove a vessel that is still afloat. It can easily be towed to a marina to be removed from the water or to an appropriate in-water disposal site after it is cleaned.

Plate 11 describes the *Mwaalil Saat* and the *Lian Gi*, two vessels in the CNMI that are currently derelict, floating, and in need of removal. Both are secure currently. The owners of both vessels have shown limited interest, and both are in reasonable proximity to coral resources. The CNMI Office of Coastal Resource Management has identified both vessels as prime removal candidates.

Plate 12 highlights another aspect of this category. All three vessels pictured were floating derelicts in February of 2002. At that time, AVP staff visited Guam and identified them as vessels at risk, with a high chance of grounding or sinking. During the Guam survey in June 2003, it was noted that two of the vessels had sunk at their moorings, and two had broken free of their moorings and grounded on or near shore during the typhoon season of 2002. Before and after photos of each vessel are shown.

While many of the vessels in the Caribbean may have at one time fallen into this category, the AVP has only made one trip to this region so it was not possible to determine the condition of vessels before they were grounded and abandoned. Of the 103 vessels that were surveyed, only 4 were still afloat (Unk2402, Unk2453, Unk2474, and Unk2477).

For more information contact the Abandoned Vessel Program at 206-526-4599 or visit the website: <http://response.restoration.noaa.gov/dac/vessels/>.

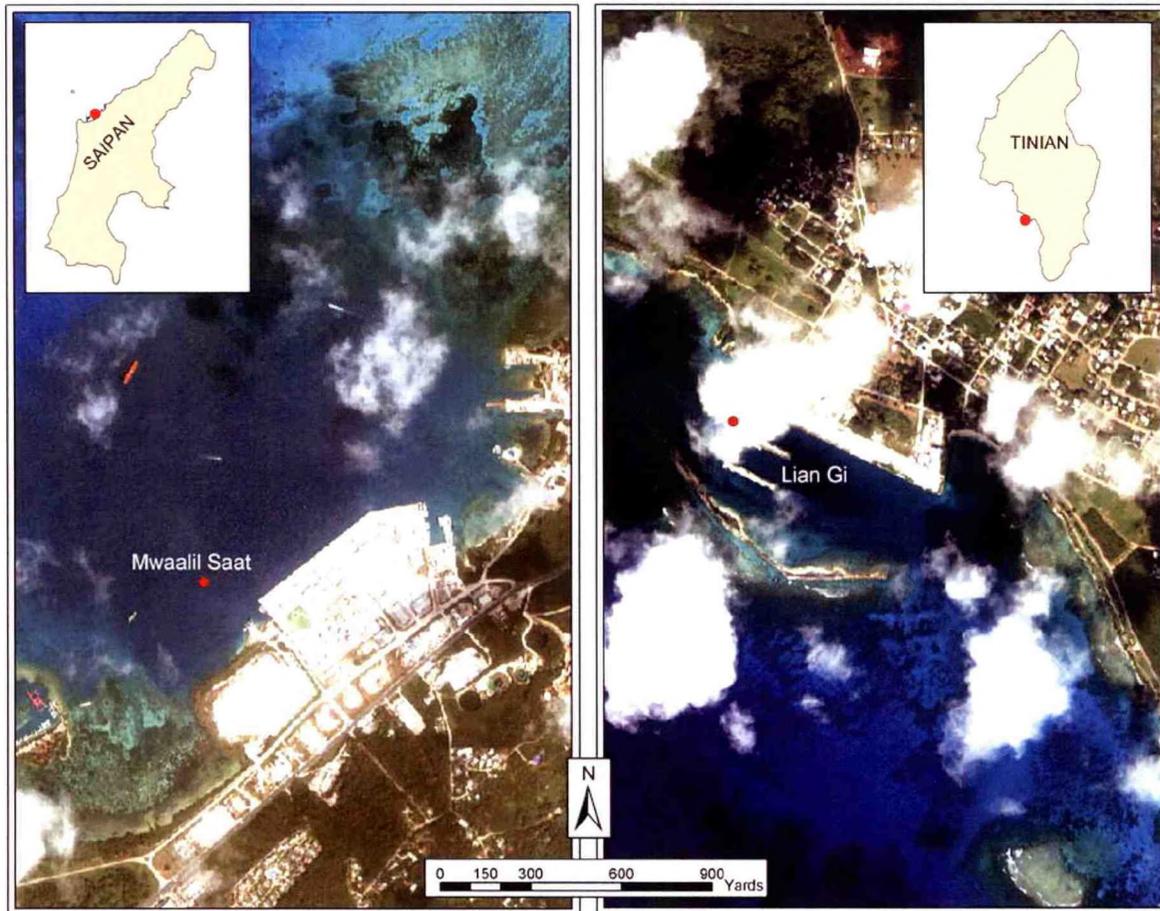


PLATE 11. *Mwaalil Saat* (Incident ID: 2546) and *Lian Gi* (Incident ID: 2577).

Removal Scenario: Derelict vessels still afloat.

Vessel Information: These vessels are currently afloat but have been abandoned by their owners. The *Lian Gi* is afloat in Tinian Harbor, Tinian and the *Mwaalil Saat* is afloat outside of the harbor at the Puerto Rico dump, Saipan. Each vessel is fully intact but is a pollution and public health risk.

General Site Characterization/ Environmental Characterization: Both are currently moored along engineered coastlines (riprap and seawall) associated with active harbors and are floating above sandy bottoms deeper than 10 ft.

Comparison to Other Vessels/Removal Considerations: Each of these vessels is of note because they are pollution and health risks that can be eliminated prior to grounding or sinking. Vessels such as these are in their last relatively easily manageable stage before becoming a much more logistically complex salvage and recovery project.



Photographs of currently (2003) derelict vessels still afloat:

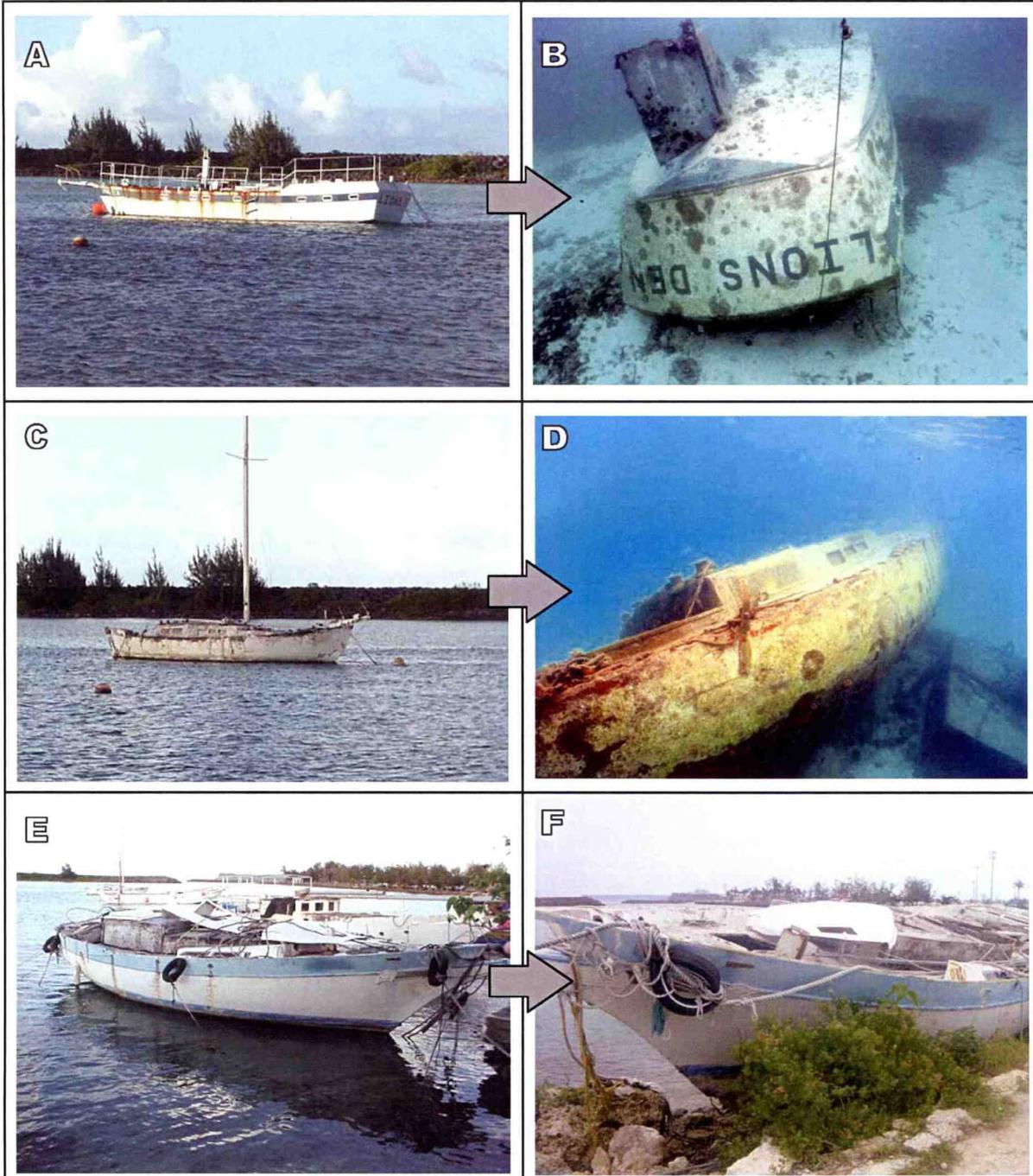
- A. *Mwaalil Saat*, moored in Saipan, 2003.
- B. *Mwaalil Saat* viewed from the stern.
- C. *Lian Gi*, docked in Tinian Harbor, 2003.
- D. *Lian Gi* as viewed from the port side.

PLATE 12. (See Below) Formerly derelict, now grounded/sunken vessels in Agana Boat Basin, Guam.

Vessel Information: The vessels pictured below were described in Plate 10 as a cluster of sunken/grounded vessels observed during the 2003 surveys. Photos A, C, and E were taken prior to Supertyphoon Pongsona in 2002. The vessels were derelict and identified as risks for grounding/sinking at that time. Photos B, D, and F were taken following the storm during the 2003 surveys.

2002

2003



Photographs of past (2002) derelict vessels and their present (2003) condition:

A& B. *Lion's Den*, Incident ID: 1901.

C&D. Unk1900, located just east of *Lion's Den*.

E&F. *Ciao*, Incident ID: 2541 (foreground) and Unk2539 (background). See Plate 10, photo D for present condition of Unk2539.

SUMMARY OF FINDINGS

- During the 2003 field surveys conducted in Guam and CNMI, 53 new vessels were identified, although a subset of these vessels may be in the AVI database but a lack of unique descriptors and/or latitude/longitude coordinates made confirmation impossible. There are also likely to be sites in the U.S. Pacific region that were not identified in the AVI database, and subsequently not surveyed. In particular, additional WWII era barges were sighted during surveys, but time and logistical constraints and the fact that these historical vessels have a low priority for removal did not permit field surveys of all barges.
- Fifty-seven (57) of 137 vessel sites identified in the AVI database for Guam and CNMI were accounted for through interviews with agency personnel and did not require field surveys because they were either removed, broken up, dry-docked, sunk as dive wrecks, etc.
- Multiple abandoned vessels were often clustered together, especially in sheltered channels, bays, and mooring areas. Typhoons, other storms, and abandonment following WWII and post-WWII operations were the cause of many of the groundings in these areas. Examples of sites with clustered distributions of vessels are: Piti Channel and Agana Boat Basin in Guam, and Outer Cove Marina in Saipan.
- Nine (9) of the 73 abandoned vessels surveyed in the U.S. Pacific region posed potential pollution threats, usually thought to be minor (small amount of fuel, marine batteries, compressed fuel tanks, contaminated ballast, coolant, hydraulic fluid, etc.).
- Thirty-three (33) vessels were determined to pose potential navigational threats. Most of these vessels were visible and in shallow water located close to marinas, mooring areas, or industrial areas. A submerged freighter (Unk2545) represented the greatest threat to navigation due to it being poorly marked, mostly submerged, and located in a heavily used recreational boating area near Managha Island.
- Fifty-four (54) vessels were considered some risk to public health, mostly from slips/falls and exposure to rusted, jagged steel by the public climbing on the vessels. A few submerged vessels were potential entrapment hazards for swimmers.
- Certainly 22 and possibly more of the surveyed vessels grounded or sunk during typhoons or other storms that passed over Guam and the CNMI, including two major storms in 2002: Typhoon Chata'an on 5 July, and Supertyphoon Pongsona on 8 December. The majority of vessels that grounded or sunk during storms were recreational sailboats, although several longliners and other commercial vessels also grounded, often in sensitive habitats (coral reef or seagrass).
- Vessels have been abandoned for periods ranging from several months to many years. Several have been abandoned for approximately 20 years, such as *Sun Long No. 8* (Incident ID: 1828), and #62 *Nam Sung* (Incident ID: 1832).
- Of the 73 vessels surveyed, 19 vessels (26 percent) were located in areas where the primary habitat being affected or potentially at risk was coral reef/hardbottom. Fifteen (15) vessels (21 percent) were located in a mixture of macroalgae/seagrass habitat. Eight (8) vessels (11 percent) were aground in or near mangroves. Three (3) vessels (4%) were potentially impacting seagrass. The remaining 38 percent of the vessels were located on

sand and gravel beach habitats, sand bottom habitats, or on man-made shorelines in developed harbors.

- Of the 73 vessels surveyed, coral reef/hardbottom habitat was directly affected or potentially impacted by 8 vessels in Guam and 11 vessels in the CMNI. Of primary concern are the vessels that grounded directly on a shallow reef flat, mostly large commercial vessels, that have debris fields scattered great distances, often with pieces of debris resting on or near live coral. Examples of these vessels are: the *Samala* (Incident ID: 1251), *Sun Long No. 8* (Incident ID: 1828), and #62 *Nam Sung* (Incident ID: 1832).
- Damage to seagrass habitat was significant for one large commercial longliner (*Nago No. 15*, Incident ID: 1253), which is high priority for removal according to local officials. Seagrass coverage surrounding the vessel was 90-100% in some areas, and seagrass was the predominant habitat type within a large distance around the vessel. A notable scour of 8-20 ft around the bow and port side was observed.
- Most vessels in mangrove habitats were stranded against or near the outer fringe. Most of these vessels were barges, several of which were several yards offshore and had mangroves growing in them. The only vessel with potential to cause additional damage to mangroves following a storm is the *Seagull* (Incident ID: 2537), which has a high priority for removal. It also rests in the Sasa Bay Marine Preserve, an important area for hawksbill sea turtles.

COMPARISON OF U.S. PACIFIC SURVEY FINDINGS TO U.S. CARIBBEAN SURVEY FINDINGS

Major Similarities

- In both the U.S. Caribbean and Pacific, the AVP identified many "new" vessels that were not correlated to incidents in our database.
- In both regions, there were many incidents in the database that could be verified or deleted without having to survey. Fifty-seven (57) of 137 vessel sites identified in the AVI database for Guam and CNMI were accounted for through interviews with agency personnel and did not require field surveys because they were either removed, broken up, dry-docked, sunk as dive wrecks, etc.
- In both the U.S. Caribbean and Pacific, a large number of vessels were clustered in mooring or other sheltered areas, and many were abandoned due to hurricanes and typhoons.
- In both the U.S. Caribbean and Pacific, a small percentage (6% and 12%, respectively) of vessels posed a pollution threat, and most threats were considered to be relatively minor.
- In both the U.S. Caribbean and the Pacific, a large percentage (46% and 74%, respectively) of vessels posed potential human health risks due to contact with rusting and otherwise damaged portions of easily accessible vessels.

Major Differences

- Depth appeared to be a more significant factor in the Pacific in terms of logistically being able to field survey vessel sites identified in the AVI database. It was not possible to

check 90 of 157 vessel sites (57%) listed due to their estimated depths of >40 ft. Yet, considering logistical constraints involving time and funding, it is likely that all priority vessels that were potentially causing damage to sensitive nearshore habitats were identified.

- A large percentage (63%) of vessels surveyed in the Pacific were abandoned or sunk during World War II, post-war operations, or following government/commercial use up until the 1960s. Government and military vessels were a small proportion of those surveyed in the Caribbean, and few vessels had been abandoned for such an extensive time period.
- The percentage of vessels surveyed potentially impacting coral reef/hardbottom habitats was much higher in the Pacific (26% of vessels surveyed) than in the Caribbean (3% of vessels surveyed).
- In contrast, the percentage of vessels surveyed potentially impacting seagrass habitats was higher in the Caribbean (22%) than the Pacific (4%), as was true for the percentage of vessels potentially impacting mangroves (28% in the Caribbean compared to 11% in the Pacific).